



CITY OF ROCKVILLE
COMPREHENSIVE TRANSPORTATION REVIEW METHODOLOGY

SEPTEMBER 29, 2004

TRAFFIC AND TRANSPORTATION DIVISION

COMPREHENSIVE TRANSPORTATION REVIEW METHODOLOGY

TABLE OF CONTENTS

I. INTRODUCTION	1
I.A. RELATIONSHIP TO CITY DEVELOPMENT PLANS AND POLICIES	1
I.B. COMPREHENSIVE, MULTIMODAL APPROACH	2
II. CTR PROCESS	4
II.A. OVERVIEW	4
II.B. INQUIRY AND SCOPING MEETING	5
II.C. OFF-SITE ANALYSES THRESHOLD AND COMPLETION OF THE TR.....	5
II.D. TRANSPORTATION REPORT REVIEW AND TRANSPORTATION STAFF REPORT.....	7
II.E. COORDINATION WITH OTHER JURISDICTIONS	8
III. FORMAT OF THE TRANSPORTATION REPORT (TR)	9
III.A. TR COMPONENT A—INTRODUCTION & EXISTING CONDITIONS.....	9
III.B. TR COMPONENT B—SITE ACCESS & CIRCULATION ANALYSIS.....	9
III.C. TR COMPONENT C—AUTOMOBILE TRAFFIC ANALYSIS	10
III.D. TR COMPONENT D—NON-AUTO OFF-SITE ANALYSIS	18
APPENDIX A: ACRONYMS.....	26
APPENDIX B: DEFINITIONS	27
APPENDIX C: COMPARISON OF STM AND CTR	30
APPENDIX D: MAP OF TRANSIT-ORIENTED AREAS (TOAS)	31
APPENDIX E: CTR METHODOLOGY FLOWCHART	32
APPENDIX F: SCOPING INTAKE FORM	33
APPENDIX G: OUTLINE OF TRANSPORTATION REPORT.....	34
APPENDIX H: SITE ACCESS AND CIRCULATION SUMMARY	37
APPENDIX I: ROAD CLASSIFICATIONS	40
APPENDIX J: INTERSECTION CAPACITY ANALYSIS—CRITICAL LANE VOLUME (CLV) METHOD.....	41
APPENDIX K: MAP OF ACTIVITY CENTERS.....	45
APPENDIX L: TDM PROGRAMS.....	46
APPENDIX M: TRANSPORTATION REPORT STUDY AREAS.....	47

COMPREHENSIVE TRANSPORTATION REVIEW METHODOLOGY

INDEX OF TABLES AND FIGURES

Table 1: Approval Types and Transportation Review*.....	1
Table 2: Relevant City Policies and National Standards.....	2
Table 3: Completion of TR Components:	7
Table 4: Minimum Transit Standards.....	10
Table 5: Auto Traffic Study Areas	11
Table 6: Trip Generation Terminology and Steps	13
Table 7: Trip Reductions	14
Table 8: Non-TOA Intersection Auto LOS Thresholds by Road Classification	17
Table 9: TOA Intersection Auto LOS Thresholds by Road Classification	17
Table 10: Non-Auto Study Areas.....	19
Table 11: Infrastructure Safety Ratings*.....	21
Table 12: Types of Mitigation and Credits*	22
Table 13: Maximum Potential Trip Reductions and Credits	23
Table 14: Maximum Trip Credit Rates for Non-Auto Facilities	24
Table 15: TDM Trip Credit	25

CITY OF ROCKVILLE

COMPREHENSIVE TRANSPORTATION REVIEW METHODOLOGY

I. Introduction

This Comprehensive Transportation Review Methodology (hereafter referred to as “CTR”), approved by the Mayor and Council of the City of Rockville, Maryland on October 4, 2004, and applicable to all new development or redevelopment applications filed on or after September 29, 2004, describes the transportation subset of the development review process. Principles and methodologies explained herein guide the City in evaluating the transportation impacts of development applications on:

- ## site access and circulation;
- ## bicycle, pedestrian, and transit facilities (hereafter collectively referred to as “**non-auto facilities**”); and
- ## automobile traffic.

This document also addresses mitigation measures to alleviate negative impacts on the transportation system due to increased automobile traffic generated by new development. The CTR replaces the City’s Standard Traffic Methodology (hereafter referred to as “STM”). A list of acronyms and key definitions are available in Appendix A and Appendix B, respectively. Appendix C outlines key differences between the STM and the CTR.

I.A. Relationship to City Development Plans and Policies

The CTR is an integral tool in evaluating the adequacy of the overall transportation system and fostering a system that accommodates anticipated local and regional demands. Consequently, it is fundamentally linked to the goals and objectives in City plans and policies. The CTR delineates detailed steps that must be performed with each new development application to measure transportation impacts and mitigate such impacts as warranted. Table 1 outlines what is required of the applicant at each stage in the transportation development review process:

TABLE 1: APPROVAL TYPES AND TRANSPORTATION REVIEW*		
Type of Approval	Type of Development Application	Scope of Review Required for Submission to City by Applicants
<i>Initial</i>	Concept Plans for Comprehensive Plan Developments (CPD)	Transportation Report (may exclude some site-specific design review that requires more detailed design).
	Planned Residential Units (PRU)	
	Some Special Exceptions (SPX)	
	Residential Town Houses (RTH)	
	Preliminary Development Plans (PDP)	
	Cluster Development Applications	
	Variable Lot Size Developments	
<i>Detailed</i>	Use Permits (USE)	Requirements of Initial Approval (if not previously approved) plus transportation analyses that require detailed site-specific design.
	Use Permit Amendments (USA), as applicable	
	Some Special Exceptions (SPX)	
	Preliminary Subdivision Plans with 10 or more lots	

** A Transportation Report under the CTR is not required in connection with any application implementing a development approved prior to the adoption of the CTR, unless said implementing application increases the amount of traffic estimated in the original traffic analysis for the entire development by 30 or more automobile trips. Subsequent implementing development applications are subject to a site-specific transportation analysis.*

Transportation goals set forth in the City Master Plan form the basis for the methodology, standards, and impact thresholds outlined in the CTR. These goals are to 1) enhance mobility and accessibility; 2) protect neighborhoods from regional and cut-through traffic; and 3) increase safety for all transportation modes.

The requirements outlined in Table 1 in conjunction with the CTR process ensure that development applications comply with the transportation standards established in the City policies, national standards and all other applicable laws listed in Table 2:

TABLE 2: RELEVANT CITY POLICIES AND NATIONAL STANDARDS		
<ul style="list-style-type: none"> € Zoning Ordinance € Master Plan € Neighborhood Plans € Transportation Demand Management Policy €#Pedestrian Policy €#Bicycle Master Plan 	<ul style="list-style-type: none"> €\$Standards and Details for Construction €#Basic Transportation Engineering Policy €#Guidelines for Neighborhood Traffic Management 	<ul style="list-style-type: none"> € Uniform Federal Accessibility Standards (UFAS) € Manual on Uniform Traffic Control Devices (MUTCD) € National best practices € Other relevant policies as adopted

Failure to give notice of required compliance with these and other applicable policies by City staff does not constitute a waiver of these requirements for development applicants.

I.B. Comprehensive, Multimodal Approach

Analyses to determine whether a development application adequately supports City policies and plans and provides adequate public facilities are based on four major factors; 1) levels of service (LOS), 2) orientation toward transit, 3) transportation demand management, and 4) accessibility.

1. Levels of Service

Typical LOS measures focus on automobile traffic. To address alternate modes of transportation, the CTR also provides standards to determine the quality and scope of services for bicycle, pedestrian, and transit modes.

2. Orientation Toward Transit (Transit-Oriented Areas)

Transit-Oriented Areas (hereafter referred to as “**TOAs**”) and non Transit-Oriented Areas (**non-TOAs**) have been identified within Rockville City limits (see Appendix D). TOAs are areas where viable non-auto options exist and include areas within 7/10ths of a mile accessible walking distance from existing and programmed Metro stations and fixed-guideway transit stations on dedicated transit rights-of-way. In addition, TOAs may also include major access routes to these areas, as approved by the Mayor and Council and shown on the TOA Map.

Transit-Oriented Areas (TOAs) and non-Transit-Oriented Areas (non-TOAs) have different LOS thresholds. More congestion is acceptable in TOAs, where viable multi-modal options exist. Stricter congestion thresholds are applied in non-TOAs where less congestion is acceptable. This policy supports the Mayor and Council Smart Growth initiative to focus development in areas close to major transit facilities.

3. Transportation Demand Management

The City’s Transportation Demand Management (hereafter referred to as “**TDM**”) Program also is designed to address the negative impacts of increased auto congestion due to single-occupancy vehicles

(SOVs). It is distinct from capacity (supply) management, as it aims to reduce the number of vehicles using road facilities by providing a wide variety of mobility options. Section III.E.2.c details how the City's TDM Program relates to the CTR.

4. On and Off-Site Accessibility

The CTR requires that all development applicants submit a Site Access and Circulation Analysis, which deals exclusively with **on-site** issues.

Furthermore, the CTR requires that development applications that generate 30 or more total peak hour site trips submit **off-site** analyses for each mode of transportation. These analyses include an assessment of major intersections that are impacted by the development and non-auto facilities that lead to the development. The goal of the off-site analyses is to ensure that the site can be accessed safely and efficiently through various modes and that adequate transportation facilities are in place to support the subject development without detriment to the overall transportation system.

II. CTR Process

The following section outlines the process of the CTR, which is established to ensure proper review of transportation impacts during the development application and approval stages, as well as compliance with City plans and policies.

II.A. Overview

The following is the sequential process of the CTR, which is discussed in further detail in Sections II.B. - II.D. below. Appendix E contains a flowchart outlining this process.

Step 1:	Potential applicant inquires in the Planning Division about development and receives Scoping Intake Form (see Appendix F) and CTR guidelines sheet from the Planning Division. An optional pre-submission Development Review Committee (hereafter referred to as “ DRC ”) meeting may be held.
Step 2:	Applicant submits Scoping Intake Form to Traffic & Transportation Division and schedules Scoping Meeting.
Step 3:	Traffic & Transportation Division notifies community associations in potentially impacted area for input on scope of off-site analyses. The location and size of the development will be included.
Step 4:	Traffic & Transportation Division holds Scoping Meeting with applicant. Representatives of community associations in potentially impacted area may submit written commentary on the study areas in advance of Scoping Meeting.
Step 5:	Traffic & Transportation Division prepares Scoping Summary. Traffic & Transportation Division notifies community associations in potentially impacted area of Scoping Summary.
Step 6:	Applicant submits Transportation Report (hereafter referred to as “ TR ”) and development application to the Planning Division. It is recommended that the TR be submitted in advance of the development application.
Step 7:	Traffic & Transportation Division reviews TR for compliance with CTR methodology.
Step 8:	Traffic & Transportation Division reviews development application.
Step 9:	Traffic & Transportation Division reviews TR for compliance with on-site standards and for transportation impacts.
Step 10:	Traffic & Transportation Division identifies impacts and mitigation measures in conjunction with other City staff and applicant. A public meeting, announced via mail and e-mail notification to HOA and Civic Association leaders, will be coordinated by staff to present the proposed study area and development impacts, and solicit comments prior to preparation of the Transportation Staff Report. This meeting will take place one time per month, as part of the regularly-scheduled Traffic & Transportation Commission meetings. If the timing of a development application is such that a meeting would need to be convened prior to the Traffic & Transportation Commission meeting, staff will send out special notifications.
Step 11:	Traffic & Transportation Division prepares Transportation Staff Report (hereafter referred to as “ TSR ”) for submittal to the Planning Division. Traffic & Transportation Division notifies community associations in potentially impacted area of TSR.
Step 12:	Approving body reviews and issues action on the development application.

II.B. Inquiry and Scoping Meeting

When an inquiry for a development application is received, the Planning Division will give the applicant a Scoping Intake Form and a CTR guidelines sheet (**Step 1**). The CTR guidelines sheet gives the applicant an overview on the transportation subset of the development review process. All applicants identified in Table 1 must complete the Scoping Intake Form (see Appendix F), submit it to the Traffic & Transportation Division, and schedule a Scoping Meeting (**Step 2**).

Upon review of the Scoping Intake Form, the Traffic & Transportation Division will notify community associations in the potentially impacted area for input on the study areas for the Transportation Report (TR). The notification will include the location and size of the proposed development. (**Step 3**).

All applicants must attend a Scoping Meeting (**Step 4**) with the Traffic & Transportation Division *prior to* the preparation of the applicant's TR. Community associations in the potentially impacted area will be notified in advance of the Scoping Meeting. Community associations may opt to provide written commentary in advance of the Scoping Meeting on the study areas to be examined in the Transportation Report.

The Scoping Meeting will provide the applicant and the Traffic & Transportation Division the opportunity to discuss detailed CTR requirements as they apply to the development site, including:

- ☞ Determination as to whether the Subject Development is within a TOA, based on the TOA Map in Appendix D;
- ☞ Automobile Traffic Study Area;
- ☞ Auto Trip Generation, Trip Distribution, and Mode Share;
- ☞ Traffic Counts from Existing and Already Approved Developments;
- ☞ Accident and Count Data (where available);
- ☞ Potential Trip Reductions and Credits;
- ☞ Additional Special Traffic Studies to be Conducted (see Section III.C.7. for detailed description);
- ☞ Non-Auto Study Area to Analyze Transit, and Pedestrian, and Bicycle Access and Facilities;
- ☞ Activity Center Locations and Access Routes;
- ☞ Intersections to Analyze for Safety Ratings; and
- ☞ Number of TR Copies to be Submitted.

At this meeting, it will also be determined whether the development exceeds the off-site threshold discussed in Section II.C. for completing TR *Component C—Automobile Traffic Analysis* and *Component D—Non-Auto Off-Site Analysis*.

Following the Scoping Meeting, the Traffic & Transportation Division will prepare a Scoping Summary (**Step 5**). This Summary will include all details of the TR agreed upon in the Scoping Meeting. The Traffic & Transportation Division will inform community associations in potentially impacted area of the Scoping Summary.

II.C. Off-Site Analyses Threshold and Completion of the TR

After the Traffic & Transportation Division approves the Scoping Summary, the applicant must prepare a TR, the content and format of which is described in detail in Section III and outlined in Appendix G. The applicant must prepare the TR in accordance with the approved Scoping Summary. The TR consists of five (5) components:

1. TR Components

Component A—Introduction and Existing Conditions:

Project description (see Section III.A.).

Component B—Site Access & Circulation:

Analysis of internal circulation, entrance configurations, vehicular access and other relevant access and on-site features; the Proposed Site Access and Circulation Transportation Statement; and the Proposed Conditions Site Plan (see Section III.B.).

Component C—Automobile Traffic Analysis (Off-Site):

Analysis of auto traffic using the technical guidelines for traffic analysis in the traffic study area (see Section III.C.).

Component D—Non-Auto Off-Site Analysis:

Analysis of access to the development from activity centers via alternative modes of transportation using the guidelines (see Section III.B.2.b) for creating an inventory of pedestrian, bicycle, and transit facilities in the non-auto study area and for analyzing intersection safety ratings for these modes of transportation (see Section III.D.).

Component E—Summary, Mitigation, and Credits:

Summary of the report findings and impacts; recommended mitigation plans. (see Section III.E.).

2. TR Off-Site Analyses Threshold

Developments that generate 30 or more total peak hour site trips have a measurable traffic impact and meet the TR off-site analyses threshold. These developments are required to complete all components of the TR, including the following off-site analyses, TR *Component C—Automobile Traffic Analysis* and TR *Component D—Non-Auto Off-Site Analysis*. Developments that generate less than 30 total peak hour site trips do not warrant the detailed off-site study, as their impact on the transportation system is typically minimal. These developments are not required to complete the off-site analyses, TR *Component C—Automobile Traffic Analysis* and TR *Component D—Non-Auto Off-Site Analysis*.

The intent of the off-site threshold may not be circumvented through the submission of piecemeal development and permit applications or other approval requests. Upon submitting a preliminary plan of subdivision that generates less than 30 total peak hour site trips, the applicant must agree in writing that if future applications or approval requests result in 30 or more total peak hour site trips generated at one location, then the applicant will be required to complete and submit all TR components for the cumulative development package. TR *Component C—Automobile Traffic Analysis* and TR *Component D—Non-Auto Off-Site Analysis* will be required to assess the impact of the total number of peak hour site trips generated.

Table 3 summarizes which TR components a development must complete based on total peak hour site trips.

TABLE 3: COMPLETION OF TR COMPONENTS*	
Total Peak Hour Site Trips*	Required TR Components
Less than 30	<i>Component A—Introduction, Component B—Site Access and Circulation, Component E—Summary, Mitigation, and Credits</i>
30 or more	All Components Required

* Peak hour site trips are calculated using the trip generation rates referenced in Section III.C.5.

* **Note:** Not all types of development applications are subject to CTR standards. **Refer to Table 1** to determine **types of development applications** that must comply with CTR standards.

Before submitting the completed development application to the Planning Division, the applicant may opt to schedule a pre-submission Development Review Committee (DRC) meeting to further discuss the details of the development application, including the TR. For all elements of the TR that require approval of methodology, use of data, assumptions, and other techniques or factors, approval must be requested and received from the Traffic & Transportation Division, taking into consideration the input of affected communities as represented by HOA/Civic Associations, the City's Traffic & Transportation Commission, Planning Commission, and Mayor & Council, as appropriate, before the completed TR is submitted. Traffic & Transportation Division reviews are based on nationally recognized standards, best practices, and methodologies.

It is recommended that the TR be submitted in advance of the development application so that compliance with the methodology can be evaluated without delays to the development review process. The applicant must submit both the TR and the development application to the Planning Division (**Step 6**).

II.D. Transportation Report Review and Transportation Staff Report

The Traffic & Transportation Division will first review the TR to ensure compliance with CTR methodology (**Step 7**). In the event that a TR is not accepted at this first review stage (i.e., it is incomplete or does not comply with the CTR methodology), the applicant must revise or submit a new TR for consideration (**Step 6**). The development application will be considered incomplete until an acceptable TR is approved by the Traffic & Transportation Division. Revisions to the TR, if necessary, must be submitted at least 21 days prior to the scheduled meeting date of the approving body.

Once a TR has been accepted by the Traffic & Transportation Division, a new TR will not need to be submitted at subsequent phases of the development approval process provided that:

- ⌘ The elapsed time from initial acceptance of the original TR to the latest development application does not exceed the horizon year. If this time limit is exceeded, an updated or revised TR must be prepared in consultation with the Traffic & Transportation Division; and
- ⌘ There are no significant changes in site characteristics (e.g., development size, land use mix, access configuration). The Traffic & Transportation Division will determine if site characteristics have been changed sufficiently to warrant a revised TR.

Once the Traffic & Transportation Division has accepted the TR, the development application will then be reviewed (**Step 8**). The TR will be reviewed for compliance with on-site standards (refer to Appendix H) and for transportation impacts (**Step 9**). The Traffic & Transportation Division will also examine and evaluate the development application's transportation impacts and mitigation measures. A public meeting, announced via mail and e-mail notification to HOA and Civic Association leaders, will be coordinated by staff to present the proposed study area and development impacts, and solicit comments prior to preparation of the Transportation Staff Report. This meeting will take place one time per month,

as part of the regularly-scheduled Traffic & Transportation Commission meetings. If the timing of a development application is such that a meeting would need to be convened prior to the Traffic & Transportation Commission meeting, staff will send out special notifications. Staff-only DRC and Staff-with-Applicant DRC meetings will be held following the public meeting (**Step 10**).

Following DRC meetings, the Traffic & Transportation Division will prepare a Transportation Staff Report (TSR) that reports transportation impacts and addresses any outstanding issues with the development application. The TSR will identify the traffic study area as an informational item for the approving body. The TSR will also provide details about required mitigations due to the negative impact of auto trips generated by the development, and conditions of approval (**Step 11**). The TSR will be sent to community associations in potentially impacted area and the approving body. Developments that generate over 150 new automobile trips will require additional review and comment from the Traffic & Transportation Commission. These comments will be forwarded to the approving body. The approving body will then review the development application, in conjunction with the TSR, Traffic & Transportation Commission comments (when applicable) and approve or deny the application (**Step 12**). Interested parties will have the opportunity to provide public comment prior to action of the approving body as outlined in the Planning Division's *Development Review Process*.

II.E. Coordination with Other Jurisdictions

Auto and non-auto improvements that are within the study area(s) of the development but are outside of City boundaries, or are not controlled by the City, will require coordination with other jurisdictions. If commitment is not guaranteed during the development review process, then a City of Rockville decision-making body (i.e. Planning Commission and/or Mayor and Council) may or may not grant approval for the development, may approve the development with conditions, or may waive the requirement with full and informed consent. For developments that generate over 150 new automobile trips, Traffic & Transportation Commission comments to the Planning Commission will include information that states whether or not commitment is required according to standards outlined in the CTR.

III. Format of the Transportation Report (TR)

The Transportation Report, as outlined in Section II.C. must document analyses, procedures, and assumptions for the required TR components. The report should be printed on 8-1/2 x 11 pages. The City will provide the applicant guidance during the scoping meeting on the required number of report copies (minimum 3, minimum 5 if County or State roads are impacted). All traffic-related data utilized in the analyses must be included in appendices to the TR. A detailed outline of the information required in the completed TR may be found in Appendix G.

III.A. TR Component A—Introduction & Existing Conditions

The purpose of the TR introduction is to give City staff a clear overview of the development application. The introduction of the TR must include a development project description, which outlines a general description of the project, the development schedule (including key stage points, phasing and timing, build-out schedule), proposed land use, TOA designation, hours of operation, and hours and a description of employment and commercial activity, size of development, and number and type of units, if applicable. In addition to the project description, the existing land use must be discussed in the TR introduction. An area/location map of the development project must also be included. Finally, the trip generation total should be identified in tabular format.

III.B. TR Component B—Site Access & Circulation Analysis

1. Proposed Site Access and Circulation Transportation Statement

All applicants must complete a Proposed Site Access and Circulation Transportation Statement as a requirement of TR *Component B*. This transportation statement must identify all planned site features that do not comply with City policies and accepted standards and codes, some of which are outlined in Appendix H, and provide justification for any deviations. Hours of deliveries, pick-ups and other services must be documented. This transportation statement must also discuss the proposed number of driveways versus auto access demand, accommodation of design vehicle, and parking supply. Finally, this transportation statement must document the following features of internal and abutting roadways: ownership, road classification, average daily traffic (**ADT**) volumes, traffic speeds, and speed limits.

2. Proposed Conditions Site Plan

The applicant must submit a Proposed Conditions Site Plan as a requirement of TR *Component B*. The site plan must address auto and truck access, non-auto access, internal circulation and parking, and other general site features. Subsequent changes to land use, density, and other site-specific characteristics may require modifications to the TR and reevaluation of the development application. The applicant must notify the Traffic & Transportation Division of any changes. The following are site access and circulation elements that must be included in TR *Component B*:

a. Auto Site Access

Auto site access is mainly provided by at-grade intersections of a private driveway and a public street. The Traffic & Transportation Division will review the site access points for appropriate design and location, based on functional area of abutting intersections, median cuts, and access points across the street, as described in detail in Appendix H, which outlines relevant City policies and standards. The TR must describe auto site access compliance with these policies and standards or discuss the justification for any deviation, as inappropriate design and/or location may adversely affect LOS and capacity of public streets.

b. Non-Auto Site Access

i. Pedestrian Connectivity to Street Network

Minimum standards for *connectivity* of pedestrian facilities consist of ensuring the availability of sidewalks on the site frontage, and in some cases, through the site. Sidewalks must be constructed according to the City Standards and Details for Construction. Further policies and standards for pedestrian site access are outlined in Appendix H.

ii. Transit—Availability of Bus Stops and Their Amenities

Minimum standards for transit facilities consist of ensuring that bus shelters, benches, or concrete pads are provided at all existing and programmed bus stops along the site frontage, as approved by Department of Public Works, in coordination with Montgomery County Department of Public Works and Transportation (DPW&T) or Washington Metropolitan Area Transit Authority (WMATA). The type of facility required is based on projected daily ridership volumes (provided by Department of Public Works), as defined in Table 4. If there are no existing or programmed transit stops along the site frontage, bus shelters, benches, or concrete pads must be provided at the nearest existing or programmed bus stop to the site, as determined by the Traffic & Transportation Division, within the non-auto study area, as defined in Section III.D.1.

TABLE 4: MINIMUM TRANSIT STANDARDS	
Projected Daily Ridership*	Required Facility
0-10 persons	Concrete Bus Stop Pad
11-25 persons	Concrete Bus Pad plus Bus Stop Bench
More than 25 persons	Bus Shelter plus Bus Bench and Bus Stop Pad

* Based on existing ridership data provided by DPW&T and WMATA plus additional ridership projected from the new development.

iii. Bicycle—Compliance with Bicycle Master Plan

Minimum standards for connectivity of bicycle facilities consist of ensuring the availability of bicycle facilities on the site frontage, or in some cases, through the site, as identified in the Bicycle Master Plan.

Non-Auto Site Access Exceptions: If a non-auto facility to be installed by a developer would be subject to removal due to an existing CIP project, the developer may instead contribute an equivalent amount toward that facility being built as a future project to be incorporated into the CIP, as approved by the City.

c. Site Circulation

The TR must describe site circulation compliance with City policies and standards or discuss the justification for any deviation.

III.C. TR Component C—Automobile Traffic Analysis

The automobile traffic description must include brief descriptions (text and maps) of the land parcel (size, general terrain features and location within the City), the roadway network (both existing and programmed) within the defined traffic study area, and existing and proposed land uses within the traffic study area. Elements of TR *Component C*, as outlined below, must be approved by the Traffic & Transportation Division before the completed TR is submitted to the Planning Division.

1. Traffic Study Area Definition

TR *Component C* must include an initial assessment of the area subject to impacts from the proposed development project. The size of the traffic study area affected by the subject development application

will depend upon the size of the development, trip generation, the configuration of the roadway system, traffic volumes, natural or man-made barriers, and the adjacent existing and proposed land uses. The traffic study area may not be limited to City boundaries. National standards and methodologies will be used to determine the traffic study area. Final determination will be made by the Traffic & Transportation Division, taking into consideration the input of affected communities, the City's Traffic & Transportation Commission, Planning Commission, and Mayor & Council, as appropriate. As the analysis proceeds, it may be necessary to modify the size of the traffic study area.

Table 5 below offers general guidance on defining the traffic study area. The minimum number of intersections that need to be included in the Automobile Traffic Analysis is based on the number of new peak hour site trips generated by the subject development (total trip generation – pass-by trips, as defined in Table 6). The number of intersections analyzed may be adjusted to reflect development-specific features, the overall level of congestion, and critical flow paths.

TABLE 5: AUTO TRAFFIC STUDY AREAS							
TRIPS New peak hour site trips ³	Minimum No. of Intersections or all Intersections within Radii*	LAND USE/DEVELOPMENT SIZE ^{1, 2}					
		Retail (SF of GFA)	Office (SF of GFA)	Residential (Units)			
				SF	TH	GA	HR
30 - 150	4	5,000- 20,000	20,000- 90,000	30-160	40-240	65-325	65-425
151 - 350	8	20,001- 45,000	90,001- 220,000	161-425	241-700	326-700	426-900
351 - 700	12 or .45 Mile	45,001- 95,000	220,001- 400,000	426-700	701- 1,250	700- 1,250	901- 1,300
> 700	16 or .50 Mile	>95,000	>400,000	>700	>1,250	>1,250	>1,300

* The number of signalized intersections or all signalized intersections within the radii (or major portals to the site), whichever is greater.

2. Roadway System Characteristics

All roads within the traffic study area must be shown on a map. The scale of the map(s) must be appropriate to the size of the site and of the traffic study area and be acceptable to the Traffic & Transportation Division. Roadway projects programmed and funded for completion at the time of development occupancy (according to City, County and State Capital Improvement Programs) must be included, if applicable. The number of lanes of each roadway must be indicated and, on the same or separate sketch, the movements permitted by lane for all intersections identified within the traffic study area. Types of intersection controls in place must be noted; as must median openings, vertical and horizontal alignment (if irregular), and location of existing access points if they have a direct effect on roadway capacity or traffic flow.

¹ Data are based on the Maryland-National Capital Park and Planning Commission, Montgomery County Department of Park and Planning Local Area Transportation Review guidelines, July 2004, and correspond roughly to trips generated during peak hours that generate the highest number of trips (A.M. or P.M.). Other land uses (schools, auto filling stations, day care centers, e.g.) shall be determined during the scoping meeting.

² Mixed-use developments must account for generations based on the different land uses.

³ The study area is based on net new trips generated **before credits** are applied.

3. Traffic Counts

Recent traffic counts must be shown for all roadways in the traffic study area. Traffic counts may not be used if more than three years old, and the use of counts older than one year old must be approved by the City. In the event recent traffic counts are not available, the applicant will be responsible for data collection.

Counts of turning movements at intersections must be included for all intersections abutting the site and all identified intersections in the traffic study area. These counts must be reported in 15-minute intervals through each peak period. Typically, peak periods are defined as weekday hours from 7-9 AM and 4-6 PM. When necessary for a particular site, the Traffic & Transportation Division may expand the peak periods to include midday weekday or Saturday hours or to cover three (3) AM and PM peak hours. Peak periods may be adjusted in accordance with nationally accepted standards and practices to take into account development-specific features that generate traffic and/or study area congestion. Adjustments may be made based on factors such as the area of congestion or if site impact is expected to be outside typical peak periods.

Traffic counts may be obtained from the City, Montgomery County, and the State Highway Administration. Traffic counts should be adjusted using seasonal adjustment factors. Traffic counts collected during the months of August, the last two weeks of December, and the first two weeks of January and September will not be accepted due to wide variations in traffic patterns during these time periods. Conflicts between differing traffic count sources will be settled by the Chief of Traffic & Transportation or designee. Historical traffic data (more than three years old) must be adjusted to reflect current year traffic volumes and patterns.

4. Background Traffic

Background traffic consists of the following three elements:

- ## all existing traffic in the traffic study area,
- ## traffic generated by approved-but-unoccupied and approved-but-not-built development or concurrent development applications in the traffic study area, and
- ## all growth in traffic generated solely by land uses outside the traffic study area (i.e., through traffic).

Growth in background traffic must be estimated *before the impact of traffic from the subject development application is evaluated*. Growth in traffic may be calculated by either extrapolation techniques or use of data obtained from area wide forecasting models. The technique utilized must be approved by the Traffic & Transportation Division prior to the completion of the TR. City staff may be able to provide data from previous TRs or area wide travel forecast models.

It is the policy of the City to reserve capacity for approved-but-unoccupied and approved-but-not-built development; therefore, the TR must be prepared to reflect the reserved capacity. Reserved capacity within the traffic study area does not take into account the growth in through traffic. This must also be addressed in the TR.

A list of background development will be provided by Community Planning and Development Services (CPDS). The basis for the traffic forecasts in this stage will be the TR *Component C—Automobile Traffic Analysis* (or comparable) prepared for the background development sites in the specific traffic study area. It will be the responsibility of the Traffic & Transportation Division to provide these forecasts to the applicant upon request for development projects within the City limits. It will be the responsibility of the applicant to obtain information on approved-but-unoccupied and approved-but-not-built development or concurrent development applications in Montgomery County and/or the City of Gaithersburg.

Background traffic estimates will need to be prepared for all time frames for which a traffic analysis will be conducted. Refer to Section III.C.5. for a discussion of the appropriate analysis time frames.

5. Site Traffic Estimation

In order to develop an estimate of the traffic generated by the site being assessed, a four-step process involving trip generation, modal split, trip distribution, and traffic assignment must be followed. If the development schedule commitment is less than five years, then the projected year of site build-out must be used. If the site is anticipated to be developed in major phases or over a greater than five-year time frame, multiple traffic estimates (and therefore multiple analyses) will be required.⁴

a. Trip Generation

The latest editions of the Maryland-National Capital Park and Planning Commission (hereafter referred to as “M-NCPPC”) Local Area Transportation Review Guidelines⁵ (hereafter referred to as “LATR”) and the Institute of Transportation Engineers (hereafter referred to as “ITE”) Trip Generation⁶ will be used as the primary sources of trip generation factors for all land uses. Trip generation rates for any uses not cited in these references may be estimated using other available sources of information and must be approved by the Traffic & Transportation Division. The Traffic & Transportation Division will provide the appropriate source of information to the applicant during the Scoping Meeting. Table 6 outlines key terminology in calculating trip generation:

TABLE 6: TRIP GENERATION TERMINOLOGY AND STEPS		
A	Calculate Total Trip Generation (Total Peak Hour Site Trips)	Use this figure for Off-site Threshold Test in Section II.C.2. (<i>Determines if Transportation Report is required, i.e. >30 trips</i>).
B	Determine Pass-by Trip Reduction	Determined in Section III.C.5.b.ii.
C	Subtract Pass-by Reduction from Total Peak Hour Site Trips (A-B)	Determines Pass-by Reduced Trip Generation
D	Calculate Existing Trips	Determined in Section III.D.
E	Calculate New Peak Hour Site Trips by subtracting Existing Trips from Pass-by Reduced Trip Generation (C-D)	<p>≠ Use this figure to determine appropriate study areas</p> <p>≠ All trip reduction and credits are deducted from this figure</p>
F	Deduct all other trip reductions , including Modal Split and Mixed Use, from New Peak Hour Site Trips (E-F)	Use this figure to complete the automobile traffic analysis in TR Component D
G	Calculate Non-Auto and TDM Credits (only if modal split has not been applied).	Determined in Section III.E.2.b.

All traffic analyses will consider peak hour trips. See Section III.C.3. for a description of peak periods. When the peak hour of the generator occurs at a time differing from the peak hour of the adjacent street, site-generated traffic volumes will be computed separately for both the peak-hour of the generator and for the peak-hour of the adjacent street. A computation of daily traffic generation should also be made and included in the applicant’s report.

⁴ Approved and unbuilt development traffic is applied to phased development by assuming full-build out for all horizon years.

⁵ The Maryland-National Capital Park and Planning Commission, Montgomery County Department of Park and Planning. Local Area Transportation Review Guidelines.

⁶ Trip Generation, Sixth Edition, Institute of Transportation Engineers, 2003.

b. Trip Reduction

Total trip generation may be reduced by considering significant on-site existing land use activities that are to be eliminated via redevelopment. Such reductions may be incorporated into the total generated traffic volume. To be eligible for this reduction, the existing land use must be active at the time that traffic counts are performed in the area. Other trip reductions may apply based on the characteristics of the development application.

The potential to use public transit or other non-auto transportation modes for site-generated trips should be considered during this stage of the process. Potential reductions in trip generation for pass-by trips and mixed-use development should also be computed at this stage in the Automobile Traffic Analysis.

i. Pass-By Trip Reduction

For commercial retail development only, the applicant may make reasonable assumptions regarding pass-by traffic, consistent with guidance provided by ITE. Pass-by trips are those that would have otherwise traveled on a street adjacent to the subject development even if the subject development had not been constructed. Pass-by reductions of up to 50% may be selected after consultation and approval by the Traffic & Transportation Division. Pass-by volumes may be used to reduce the gross generated traffic volume. However, gross traffic volumes must be considered in further traffic analysis stages for evaluating driveway design and other circulation elements. Pass-by percentages may not be used to reduce parking or other on-site requirements.

ii. Modal Split and Mixed-Use Trip Generation Reduction

Assumptions regarding modal split, the amount of transit use and/or ridesharing to and from the subject development, must be documented in all traffic analyses submitted. Modal split reductions are based on regional and census data and will only be applied in TOAs and in consultation with the Traffic & Transportation Division. No modal split reductions will be applied without participation in the City's TDM Program. Development applications that are granted modal split reductions are ineligible for TDM trip credit, as outlined in Section III.E.2.

Reduction in trip generation within mixed-use developments should be computed at this stage as approved by the Traffic & Transportation Division. Table 7 outlines the maximum trip reduction allowed for modal split and mixed use development:

TABLE 7: TRIP REDUCTIONS		
Type of Trip Reduction	Maximum Reductions Allowed	
	TOA	Non-TOA
Modal Split	15%	N/A
Mixed Use	10%	5%

Note: The off-site analyses threshold outlined in Section II.C.2. is based on total trip generation without any trip generation reductions or credits (Section III.E.). The **maximum total amount of trip reductions and credits** allowed per development application is 30% of new peak hour site trips generated in a TOA and 20% of new peak hour site trips generated in a non-TOA after pass-by trip reduction is applied and before any other trip reductions or credits are applied.

c. Trip Distribution

Regional trip tables produced by the M-NCPPC are the preferred source for the distribution of trips. Copies of these tables can be found in the latest edition of the LATR guidelines. The Traffic & Transportation Division may approve or require the applicant to use an alternative methodology as deemed necessary. City staff will assist the applicant or designee in obtaining this information, as may be available and applicable to the site.

d. Traffic Assignment

Site-generated traffic volumes should be assigned to the roadway network within the traffic study area using the distribution factors previously developed. Assignments should initially be made according to “shortest path” methods. Reassignment using multiple routings to balance traffic flows may be used with the approval of the Traffic & Transportation Division.

6. Intersection Capacity Analysis

During this stage of the traffic analysis, evaluations of existing traffic conditions and of forecast year traffic conditions with the subject development project are conducted. The results of these evaluations will be reported in terms of facility critical lane volume (CLV), volume to capacity (hereafter referred to as v/c) ratios, and LOS. These concepts are described in more detail in Appendix J.

In Rockville, system capacity is generally governed by the capacity of individual intersections. Levels of service must therefore be determined for all identified intersections in the traffic study area, using the Critical Lane Analysis technique described further in Appendix J.

The Lane Use Factors are based on typical conditions. In instances where favorable or unfavorable conditions are present, the factors may be modified as approved by the Traffic & Transportation Division. Such modifications must be noted in the TR.

Application of Critical Lane Analysis techniques generally requires professional assistance (consultant traffic engineer, planner, or Transportation and Traffic Division). Further guidance may be obtained from Transportation and Traffic Engineering Handbook⁷ and other transportation reference books.

7. Other Studies

As part of the evaluation stage of the traffic analysis, it may be necessary to perform additional special studies, as determined the Traffic & Transportation Division, in order to identify roadway deficiencies not directly evident from the level of service calculations. All studies must be noted in the TSR.

a. Neighborhood Impact Studies

Special studies may be required as a part of TR *Component C* if neighborhoods are affected by a proposed development project due to cut-through traffic or other potential impacts.

i. Average Daily Traffic (ADT) Study

If residential streets are affected by the subject development project, an ADT analysis may be required. Proper methodology will be determined by the Traffic & Transportation Division.

ii. Traffic Calming Study

A traffic calming study will be required when subject development could potentially impact surrounding communities. Proper methodology will be determined by the Traffic & Transportation Division.

b. Accident Studies

Accident studies may be necessary at locations with a history or expectancy of safety problems, as identified by the Traffic & Transportation Division. The applicant will be expected to identify suitable counter-measures to deal with potential safety problems.

⁷ Transportation and Traffic Engineering Handbook (4th Edition), Institute of Transportation Engineers, 1999.

c. Traffic Signal Study

The purpose of a traffic signal study will be to determine the need for a traffic signal at access points or other nearby non-signalized locations.⁸ This requires a 12-hour turning movement count or estimate (for the forecast year and including site-related traffic), collection of other related data and analysis in accordance with the Manual on Uniform Traffic Control Devices (MUTCD).⁹ At access points where a traffic signal already exists, the applicant will be responsible for determining all necessary modifications to the existing signal due to site-generated traffic so that it operates in a safe and efficient manner.

d. Turning Lane Study

Exclusive turning lane studies may be necessary to determine the need and/or adequacy of turning lanes for handling forecasted traffic volumes without interference to adjacent travel lanes. For signalized and unsignalized intersections, the length of left turn lane(s), in feet (not including taper), must equal or exceed the equivalent car length for the number of left turns per peak hour per lane, with a minimum turn lane length of 100 feet. The need for right turn lanes may also be reviewed.

e. Interchange Capacity Study

If an interchange capacity study is required, proper methodology will be determined by the Traffic & Transportation Division.

f. Other

Other special traffic studies may be necessary in order to address potential traffic problems.

8. Evaluation of Impacts

a. Analysis of Existing Conditions

The inventory traffic data collected in Sections III.C.3 and III.C.4 and evaluated in accordance with Sections III.C.5 and III.C.6 must be reported in TR *Component C*. The TR should illustrate on a traffic study area map the existing daily traffic volumes within the traffic study area and the peak hour turn movement volumes at identified intersections within the traffic study area. The analysis of existing conditions (i.e., LOS analyses) should likewise be presented graphically as well as documented in TR appendix worksheets.

b. Analysis of Forecasted Conditions

TR *Component C* must present the traffic forecasting conducted in Sections III.C.5 and III.C.6 and the evaluation of forecasted conditions performed in accordance with Sections III.C.7 and III.C.8. Trip generation, inclusive of trip reductions, outlined in Section III.C.5.b, but not potential trip credits, outlined in Section III.E, must be used for the total trip analysis in TR *Component C*. Included in this component of the TR must be figures that illustrate, at the minimum, the following information:

- ≠# The assumed distribution and assignment of automobile trips generated by the subject development (daily, AM peak and PM peak hour or Saturday midday peak hour, where applicable);
- ≠# The forecasted intersection turn movements within the traffic study area divided into existing, background, site, total, and total with mitigations; and
- ≠# The assumed lane geometry and number of signal phases for intersections analyzed as well as the computed CLV, v/c ratio, and LOS.

⁸ This requirement may change if the State of Maryland adopts new signal warrants.

⁹ Manual on Uniform Traffic Control Devices for Streets and Highways, U.S. Department of Transportation, Federal Highway Administration, 2003 or as revised.

All steps within the forecasting process must be fully documented in the text and related tables. At the minimum, this information must include descriptions of the background traffic growth, approved-but-unoccupied development or concurrent development forecast assignments, proposed site trip generation assumptions, proposed site modal split, and procedures used to distribute and assign site-generated vehicle trips. The locations with deficiencies at the forecast year(s) must be so noted in map form.

c. Analysis of Capacity

Auto capacity will be considered inadequate if a subject development application's forecasted traffic when added to background traffic in the defined traffic study area (Table 5) exceeds any of the intersection v/c ratios outlined in Table 8 for development applications in non-TOAs and Table 9 for applications within TOAs. (See Appendix I for a description of road classifications).

Any conditions exceeding the following LOS thresholds, as determined for all locations within the defined traffic study area, constitute significant and notable impacts:

TABLE 8: NON-TOA INTERSECTION AUTO LOS THRESHOLDS BY ROAD CLASSIFICATION		
Road Classification*	Volume/Capacity (v/c) Ratio	LOS
Primary Residential – Class II (Minor Collector), Secondary Residential	Less than 0.80	C
Major Arterials (Except where two Major Arterials connect), Minor Arterials, Primary Residential – Class I (Major Collector), Primary Industrial, Secondary Industrial	Less than 0.90	D
Business District roads, freeway ramps, and for locations where two Major Arterials intersect	Less than 1.0	E

**At intersections where two or more roads with different road classifications meet, the LOS threshold will be established based on the higher roadway classification (the classification where more congestion is acceptable).*

Within TOAs and their major access routes, any conditions exceeding the following LOS thresholds, as determined for all locations within the defined traffic study area, constitute significant and notable impacts:

TABLE 9: TOA INTERSECTION AUTO LOS THRESHOLDS BY ROAD CLASSIFICATION		
Road Classification*	Volume/Capacity (v/c) Ratio	LOS
Primary Residential – Class II (Minor Collector), Secondary Residential	Less than 0.90	D
Major Arterials, Minor Arterials, Primary Residential – Class I (Major Collector), Primary Industrial, Business District and Secondary Industrial	Less than 1.0	E

**At intersections where two or more roads with different road classifications meet, the LOS threshold will be established based on the higher roadway classification.*

The following circumstances also constitute an impact and may require mitigation:

- ⌘ A deterioration in intersection LOS by one level (0.10 v/c) or greater;
- ⌘ Additional auto trips that cause the City's criteria for acceptable traffic volumes on residential streets to be exceeded, as outlined in the Master Plan;
- ⌘ Development applications that contribute significantly toward the need for, or modification of, a traffic signal or other traffic control devices as established in the Manual on Uniform Traffic Control Devices or determined by the Director of Public Works or designee;

- ≠# The capacity of a turning lane is exceeded as established in the Policy on Geometric Design of Highways and Streets (AASHTO) or determined by the Director of Public Works or designee;
- ≠# Any condition creating or aggravating a safety hazard for motorists, pedestrians, or bicyclists; and
- ≠# Contradiction of principles of proper design and location for driveways, medians and median openings, service drives, and similar facilities.

For any development activity whose impact is a v/c ratio increase of 0.01 or more at intersections where the LOS for “background” traffic conditions exceed acceptable congestion thresholds outlined in Tables 8 and 9, new development applications must:

- ≠# Mitigate at least half of the impact if their impact is 0.01-0.06.
- ≠# Mitigate their impact to 0.03 or less if the impact is greater than 0.06.

d. Residential Neighborhood Impacts

Rockville's Neighborhood Traffic Control Policy places limits on the daily traffic allowable on certain residential street classifications, above which traffic diversion or other mitigation is required.

The limits are as follows:

<i>Primary Residential Class II</i>	<i>5000 cars per day</i>
<i>Secondary Residential</i>	<i>2000 cars per day</i>

Any development activity that would cause these limits to be exceeded must be fully mitigated in the development application.

III.D. TR Component D—Non-Auto Off-Site Analysis

Non-auto transportation systems must be accessible and safe for all users in order to be attractive. The analysis provided in *TR Component D* is used to ensure that these objectives are met. For pedestrian, bicycle and transit modes, analysis of existing conditions, evaluation of impacts from the subject development, and proposed mitigations and improvements must be submitted with the non-auto off-site analysis.

1. Non-Auto Study Area

The determination of non-auto study areas will be based on trip generation. In *TR Component D*, the applicant must inventory and evaluate non-auto facilities along routes to activity centers within a certain radii of the development site (see Table 10). Activity centers are areas with destinations such as schools, shopping, recreational facilities, and other points of attraction. The applicant will determine which activity center routes to evaluate in coordination with the Traffic and Transportation Division. All routes analyzed in *Component D* must be approved by the Traffic & Transportation Division. Selection of routes will be based on land uses surrounding the access route, volume of activity, and priority of the City to attract persons to the activity center(s).

Appendix K contains a map of activity centers identified by the Traffic & Transportation Division in November 2003. Locations of activity centers may be changed over time by the Traffic & Transportation Division based on new development activity. The radii for non-auto study areas are based on City analysis of walk sheds to non-auto facilities and national studies of how far individuals will travel to use non-auto facilities. **Note:** The non-auto study areas outlined in Table 10 are not the same as the study area defined for automobile traffic described in Section III.C.1.

TABLE 10: NON-AUTO STUDY AREAS						
New Peak Hour Site Trips	30-350		351-500		500+	
Minimum Activity Center Routes Evaluated	1		2		3	
Accessibility to Activity Centers	.25 mile radius	.35 mile radius	.35 mile radius	.45 mile radius	.45 mile radius	.5 mile radius
TOA Designation	TOA	Non-TOA	TOA	Non-TOA	TOA	Non-TOA

Note: The radii of a study area can be expanded up to .5 mile for developments in TOAs when considering installation of transit facilities. For example, if installation of bus facilities is planned within a TOA, the radii of the study area can be as large as .5 mile for all developments regardless of peak hour site trips generated.

2. Bicycle Facilities Analysis

Bicycle levels of service are based primarily on the levels of comfort that riders feel on designated facilities. The City's goal for the bikeway network is to maintain a Bicycle LOS (BLOS) of "C"¹⁰. This can be accomplished by providing facilities that connect and are accessible. Samples of BLOS at certain City intersections can be found in the Bicycle Master Plan Section 2.C.2.

Within the non-auto study area, bicycle facilities must be evaluated for connectivity to activity centers. Routes via bicycle facilities to activity centers will be determined by the Traffic & Transportation Division, based on the City's Bicycle Master Plan, and applicants will be responsible for compiling an inventory of bicycle facilities along those routes (bicycle facility maps can be provided by the Traffic & Transportation Division). All bicycle facilities, including shared roadways, signed-shared roadways, bike lanes, shared-use paths, or widened sidewalks as determined in the City's Bikeway Master Plan, that lie within the non-auto study area must be identified in TR *Component D*.

3. Pedestrian Facilities Analysis

Within the non-auto study area, selected sidewalks must be evaluated for connectivity from the site to activity centers. The Traffic & Transportation Division will determine which pedestrian routes to activity centers, as identified in the Scoping Meeting, must be evaluated in TR *Component D*. Applicants will be responsible for compiling an inventory of pedestrian facilities along these routes and must demonstrate compliance with the Pedestrian Policy.

4. Transit Facilities Analysis

An inventory of the availability of public and private transit service along selected activity center routes must be included in TR *Component D*. The location of bus routes, frequency of service, hours of operation, existing daily ridership levels, and bus stops and amenities (concrete pad, bench, bus shelter and connectivity to the sidewalk network) at existing and programmed bus stops in the non-auto study area must be noted where applicable. The transit inventory must also include lighting features (overhead streetlights) at transit stops and nearby parking areas, as well as availability (posting) of schedules or real-time transit information.

¹⁰ As defined in the Bicycle LOS Model described in detail in the Bicycle Master Plan. In this model, Level "A" reflects the best conditions for bicyclists; Level "F" represents the worst conditions. BLOS is calculated based on volume of directional traffic, speed limit, lane width, pavement surface, percentage of heavy vehicles, and other roadway and sidewalk characteristics and conditions.

5. Intersection Safety Analysis

a. Standards

Safety of pedestrian, bicycle, and transit facilities is determined by **Intersection Safety Ratings**, as described below in Section III.D.5.c. Safety ratings take into account road classification, physical infrastructure at intersections, and pedestrian crossing times. Additionally, design guidelines provided in Appendices H and J, which include signage, marking standards, paved shoulders/physical separation from roads, curb cuts and ramps, crosswalks, lighting, and enhancements at intersections, must be implemented when warranted by the City.

Minimum standards for the safety of bicycle, pedestrian, and transit facilities consist of the following:

- ## At signalized intersections where the City controls signal timing, safety ratings for all intersections in the non-auto study area are rated at least adequate, as defined in Table 11.
- ## At signalized intersections in the non-auto study area where signals are not controlled by the City, the intersection safety rating is at least adequate, as defined in Table 11, *excluding the factor of signal timing that allows for intersection crossing time*¹¹.

b. Study Area for Safety Ratings

The intersections to be rated for intersection safety will be identified at the Scoping Meeting¹². National standards and methodologies will be used to determine the safety ratings study area. Safety ratings will be determined for signalized intersections that lie within either the auto traffic study area defined in Table 5 or the non-auto study area defined in Table 10.

c. Data Collection and Steps to Determine Safety Ratings

The TR must include an inventory of bicycle, pedestrian, and transit safety ratings for *signalized intersections as well as* intersections determined by the Traffic & Transportation Division to be *major unsignalized intersections*. An objective of this process is to take into account road classifications and physical engineering of the intersection to determine the level of safety at the intersection. Identifying road classification is important in determining the safety rating, as traffic speed and volume vary with road class. Steps to determining and assigning intersection rating are as follows:

- i. Identify the street classification of intersection approaches at signalized and major unsignalized intersections (as determined during the scoping meeting) within the safety ratings study area. See Appendix I for a description of road classifications. A map of City road classifications can be found on the City's website, www.rockvillemd.gov/residents/traffic.
- ii. Identify the infrastructure at each approach. Note that the infrastructure consists of what is available for a pedestrian or bicyclist traveling in the same direction as automobile

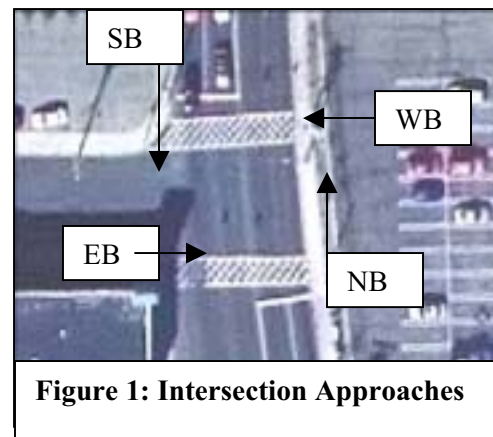


Figure 1: Intersection Approaches

¹¹ Where operational aspects such as signal timing may not be directly controlled by the City, staff will work with the applicant to coordinate potential inter-jurisdictional agreements to implement new physical infrastructure to improve safety.

¹² The Traffic & Transportation Division may select key unsignalized intersections in addition to signalized intersections to be analyzed for intersection safety.

traffic. For example, in Figure 1, the southbound intersection (business district) has no infrastructure in place. The westbound and eastbound intersections have cross-hatched crosswalks. The northbound intersection is not applicable (n/a) because it is a through-sidewalk.

Refer to Table 11 to assign each approach an **infrastructure safety rating**. Note that in order for an intersection to attain a specific safety rating, it must possess all the elements outlined in the next lesser safety rating and at least one element of the safety rating in question. The intersection remains in this safety rating category until all the elements of that category are present and along with one element of the next better safety ratings category.

TABLE 11: INFRASTRUCTURE SAFETY RATINGS*		
Intersection Rating	Safety Rating Indicators	
Poor	At least one of the following is present: <ul style="list-style-type: none"> ☐ Channelized Right Turn Lane (also referred to as a “Hot Right”) ☐ Sight Distance Problems ☐ Inadequate Crossing Time 	Unacceptable
Sub-Par	No “Poor” elements are present and at least one of the following is present: <ul style="list-style-type: none"> ☐ No Pedestrian Crossing Signals ☐ Hot Right Turn 	
Adequate	No “Poor” or “Sub-Par” elements are present and there are at least one of the following: <ul style="list-style-type: none"> ☐ Pedestrian Crossing Signals ☐ Pedestrian Refuge Islands ☐ Marked Crosswalks -Or- Hot Right Turn is present but treated with at least one of the following: <ul style="list-style-type: none"> ☐ Cross-hatch Crosswalks ☐ Turn Restrictions ☐ Illuminate Crosswalk and is not at a Major or Arterial intersection.	Acceptable
Good	“Adequate” elements are present when warranted and there are least one of the following: <ul style="list-style-type: none"> ☐ “Yield to Pedestrian” Signs ☐ Turn Restrictions ☐ Cross-hatch Crosswalks 	
Excellent	“Good” elements are present when warranted and there are innovative treatments such as <ul style="list-style-type: none"> ☐ Additional (advance) Pedestrian Crossing Time ☐ Countdown Signals ☐ Other Innovative Treatments as approved by Traffic & Transportation Division and in conformance with MUTCD 	

**Intersections assigned an “N/A” rating do not lead to destinations or are “through” sidewalks (i.e., a “T” intersection).*

- iv. Determine if the **intersection crossing time** is adequate based on City standards:
 1. Determine the length of lanes that a pedestrian must cross. This measure is in feet and accounts for the full crossing length (i.e., curb to curb).

2. Determine the amount of time that the “Flashing Walk” signal appears. Note: do not count the “Steady Walk” (the white or steady red hand) time.
3. Divide the length of lanes to be crossed by 4 (i.e., Distance/4). If the flashing walk time is less than the length of the lanes divided by 4, then crossing time is inadequate.
4. When there is no crossing time data on one segment of a parallel intersection (i.e., if time is given for EB but not WB), then crossing time is assumed to be the same as the other segment of the parallel intersection.

Infrastructure safety ratings and determination of adequate or not adequate crossing time for all approaches within the safety ratings study area must be submitted with the TR. TR Component E—Summary, Mitigation, and Credits

6. Summary of Development Application Issues and Impacts

Upon completion of the required analysis of the impacts of the proposed development project, a summary of all impacts must be developed and included in the TR. Applicants must summarize all issues and impacts related to site access and circulation, automobile traffic, non-auto facilities and intersection safety. All impacts must be noted in *TR Component D* and should be organized in a chart listing impacts on the left with intended mitigating actions on the right.

7. Mitigation

If intersection LOS thresholds are not met and intersections fail, as defined in Section III.C.8.c. above, mitigation must be implemented to bring congestion to an acceptable LOS in order for the development to be approved. Trip credits for mitigation are applied against new peak hour site trips. Mitigation plans must be approved by the Traffic & Transportation Division.

Mitigation may consist of:

- ≠# Implementation of, or monetary contribution towards, proximate physical roadway modifications that increase auto capacity sufficiently to bring LOS to acceptable levels;
- ≠# Implementation of, or monetary contribution towards, physical non-auto improvements that appropriately address project-specific impacts through an alternative means, as approved by the Traffic & Transportation Division (Table 14); and
- ≠# Participation in the City’s TDM Program or alternative TDM program, as approved by the Traffic & Transportation Division (Table 15). Note that no additional credit will be applied if modal split is used in traffic analyses.

Table 12 summarizes the types of mitigation an applicant can consider in developing mitigation plans:

TABLE 12: TYPES OF MITIGATION AND CREDITS*		
Mitigation	Maximum Credits Allowed	
	TOA	Non-TOA
Off-site mitigations to roadway network that a developer offers to implement. Goal is to lessen the impact from trips generated by the development.	Variable Credit, Depending on Improvement	
Off-site mitigations to non-auto facilities that a developer offers to implement.	15% of Trips	10% of Trips
Implementation of a Transportation Demand Management Program	15% of Trips	10% of Trips

**Note: On-site mitigations (per minimum standards) for access, circulation, pedestrian, bicycle, and transit facilities are required and therefore are not eligible for mitigation credits.*

The **maximum total amount of trip reductions and credits**, as outlined in Table 13, allowed per development application is 30% of new peak hour site trips generated in a TOA and 20% of new peak hour site trips generated in a non-TOA after pass-by trip reduction is applied and before any other trip reduction or credit is applied. Trips are credited against the total trip generation for the site and not at specific intersections. However, mitigation will be targeted toward intersections that are impacted by the new development. Drive-through facilities are *not* eligible for modal split reductions, mixed use reductions, or trip credits but *may be* eligible for other trip reductions.

TABLE 13: MAXIMUM POTENTIAL TRIP REDUCTIONS AND CREDITS		
Type of Trip Reduction or Credit	Maximum Credits Allowed	
	TOA	Non-TOA
Modal Split Reduction	15%	N/A
Mixed-Use Development Reduction	10%	5%
Non-Auto Improvements Credit	15%	10%
TDM Credit	15%	10%
<i>Combined Trip Reductions and Credits Ceiling</i>	30%	20%

a. Roadway Improvements

TR *Component E* must fully document and evaluate potential roadway mitigating actions for the development project. If applicable, a map illustrating potential mitigating actions should be included. This map should graphically depict proposed modifications to existing and programmed roadway configurations. The traffic analysis should be detailed enough to confirm the feasibility and establish the cost of proposed mitigating actions and should present the commitment of the applicant to provide these measures as appropriate. Final functional plans for roadway improvements should be submitted at the detailed engineering stage in the site development review process. The development application will receive trip credits for roadway mitigating actions as applicable.

b. Non-Auto Improvements

Applicants are encouraged to mitigate transportation impacts identified in TR *Components C & D* and bring their impact level to acceptable levels, as defined in Section III.C.8, by providing non-auto improvements and modifications to the transportation system. Applicants may receive trip credits only for non-auto improvements approved by the Traffic & Transportation Division that are *beyond* minimum requirements or otherwise required on-site. Trip credits will be applied as mitigation according to the rates outlined in Table 14 and may include a combination of facilities, recognizing that certain facilities and programs are more effective in reducing trips than others. Mitigation involving transit facilities must be done in coordination with DPW&T and WMATA, taking into account the effects such facilities may have on operational costs and transit planning. In addition, differential trip credit will be applied based on whether or not the development is within a TOA.

TABLE 14: MAXIMUM TRIP CREDIT RATES FOR NON-AUTO FACILITIES

New Peak Hour Site Trips Generated	30-100		101-200		More than 200	
Facility ¹	TOA	Non-TOA	TOA	Non-TOA	TOA	Non-TOA
	Credit per Facility	Credit per Facility	Credit per Facility	Credit per Facility	Credit per Facility	Credit per Facility
Shared bicycle/ped. path at least 8' wide, 130' long	4	3	5	4	6	5
Sidewalk at least 4' wide, 130' long ²	3	2	4	3	5	4
Bicycle lane at least 4' wide, 130' long ^{2,3,4}	3	2	4	3	5	4
Indoor shower for bike commuters	3	2	4	3	5	4
Curb extension at intersection ⁵	1	1	1	1	1	1
Bike Locker (holds 2 bikes)	2	1	3	2	3	2
Bike Rack (>5 bike slots)	2	1	3	2	3	2
Concrete Pad at Bus Stop ⁶	2	1	2	1	2	1
Bus Bench ⁶	2	1	3	2	4	3
Bus Shelters ⁶	5	3	6	4	7	5
Bus pull-off ⁷	2	1	3	2	3	2
Multimodal Transit Center ⁹						
<i>Enclosed (Indoor)</i>	N/A	N/A	25	20	30	20
<i>Covered (Outdoor)</i>	N/A	N/A	20	15	25	15
Transit Information Kiosk ¹⁰	10	10	15	10	20	10
Transit Information Board ¹¹						
<i>Real-Time</i>	7	7	12	12	17	17
<i>Static</i>	1	1	2	2	2	2

¹ "Per facility" refers to the number of credits granted per installation of one facility of the indicated type. Credits are applied above and beyond minimum requirements for adequate public facilities or what is otherwise required on-site.

² When a sidewalk or bike facilities installed is not an exact multiple of 130' long, remaining fractions will be pro-rated.

³ Facilities must link to existing or programmed portions of the bicycle network in the Bicycle Master Plan. Total width, length, and location will be determined by the Traffic & Transportation Division at time of development approval, based on development type and size.

⁴ Bicycle lanes that require street lane widening will be credited the same amount as shared bicycle/pedestrian paths.

⁵ This facility must decrease the distance pedestrians must travel to cross a street.

⁶ Other than those required in the non-auto study area. Concrete pads must be installed before a bench or shelter is installed. Locations based on ridership numbers and by determination of the Traffic & Transportation Division.

⁷ Bus pull-offs are not desirable along roads classified as arterial due to speed and volume of traffic. Installation of pull-offs will be determined by the Traffic & Transportation Division and in coordination with Montgomery County Department of Public Works & Transportation.

⁸ Subsidization of a bus stop, portion of a bus route, or extension of service where service is scheduled to be eliminated by Montgomery County Department of Public Works & Transportation due to low ridership or other factors.

⁹ A facility that is a dedicated space for transit information with a public waiting area. Commercial lobbies do not qualify. Must include no less than 1 seat for a transit resource person and no less than 5 seats in the public waiting area. Must be within .7 mile (3696 feet) of at least two bus stops and/or Metro stations.

¹⁰ A facility with transit information and a resource person but no public waiting area.

¹¹ A facility that includes maps and schedules (when possible) of transit services.

c. Transportation Demand Management (TDM) Program

The City's TDM Program and TDM Policy aim to reduce single-occupancy auto (SOV) trips and implement demand management throughout the City. In a TOA, a maximum of **15% trip credit** may be applied for a developer's implementation of a TDM program (see Appendix L) and participation in the City's TDM Program. Credit will be applied to new peak hour site trips before any other trip credits or reductions (apart from pass-by reduction) are applied for the development application. Development in non-TOAs may be eligible for a maximum of 10% TDM trip credit to be applied to new peak hour site trips before any other trip credits or reductions, apart from pass-by reduction, are applied for the development application. TDM trip credit is summarized in Table 15 below.

TABLE 15: TDM TRIP CREDIT	
TOA Designation	Maximum Credit Amount*
TOA	15%
Non-TOA	10%

**Applied to new peak hour trips before any other trip credits or reductions, apart from pass-by reduction, are applied for the development application.*

Note: When a development application is approved for trip reduction based on modal split, as described in Section III.C.5.b.ii., it is not eligible for TDM trip credit.

d. Summary of Mitigations and Potential Credits

Applicant should summarize mitigation plans in tabular format with corresponding credit rates.

Appendix A: Acronyms

Acronym	Definition
AASHTO	American Association of State Highway and Transportation Officials
ADA	Americans with Disabilities Act
ADT volumes	Average Daily Traffic volumes
BLOS	Bicycle Level of Service
CLV	Critical Lane Volume
CPD	Comprehensive Plan Development Permit
CPDS	Community Planning and Development Services
CTR	Comprehensive Transportation Review
DPW&T	Montgomery County Department of Public Works and Transportation
DRC	Development Review Committee
ITE	Institute of Transportation Engineers
LATR	Local Area Transportation Review Guidelines
LOS	Level of Service
M-NCPPC	Maryland-National Capital Park and Planning Commission
MUTCD	Manual on Uniform Traffic Control Devices
PDP	Preliminary Development Plan Permit
PRU	Planned Residential Units Permit
RTH	Residential Town House Permit
SOV	Single-Occupancy Vehicle
SPX	Special Exception Permit
STM	Standard Traffic Methodology
TDM	Transportation Demand Management
TOA	Transit-Oriented Area
TR	Transportation Report
TSR	Transportation Staff Report
UFAS	Uniform Federal Accessibility Standards
USE	Use Permit
V/C Ratio	Volume to Capacity Ratio
WMATA	Washington Metropolitan Area Transit Authority

Appendix B: Definitions

Word or Acronym	Definition
Accessibility	Describes how destination points can be approached or entered by way of the transportation network
Activity centers	Areas with destinations such as schools, shopping, recreational facilities, and other points of attraction
Adequacy	Sufficiency to satisfy minimum transportation standards
Applicant	Any individual, association, firm, partnership, corporation, government agency, or duly authorized representative submitting a development application
Approving Body	The appropriate authority identified in the Zoning Ordinance
Capacity	Maximum number of vehicles that can pass a given point during one hour under prevailing network and traffic conditions
Connectivity	Ability to make and maintain a connection between two or more points in the transportation system
Crosswalk	A right-of-way within a block dedicated to public use, intended primarily for pedestrians and from which motor-propelled vehicles are generally excluded, and which is designed to improve access to adjacent roads or lots
Development	Any new development or significant redevelopment application presented to the City after date of CTR adoption; any activity, other than normal agricultural activity, which materially affects the existing condition or use of any land or structure
Development Review Committee	Group comprised of representatives of City departments who are involved the site plan review process; members review development applications and discuss issues relating to the proposed use and design in a comprehensive manner
Improvement	Any building, structure, road, driveway, parking or loading area, pedestrian path, landscaping, screening, fencing, or recreational facility
Improvement, public	Any or all of the following: roads and streets, alleys, grading, road pavement, curbs and gutters, sidewalks, crosswalks and pedestrian paths, water mains, sanitary sewer lines, water supply and sewage disposal, storm sewer lines and drainage structures, curb returns, sidewalk and driveway entrances in rights-of-way, guardrails, retaining walls, sodding, planting, monuments and streetlights
Intersection Capacity Analysis	Evaluation of existing background conditions, traffic conditions, and of forecast year traffic conditions with the subject development project
Intersection Safety Ratings	Indicators used to rate the intersection safety of pedestrian, bicycle, and transit facilities
Law	Any law, ordinance, resolution or regulation, whether enacted by the Federal, State, County, City or other unit of government or agency thereof
Level of Service	Level of performance of a public facility; a set of operating conditions describing the ability of a transportation network to handle traffic

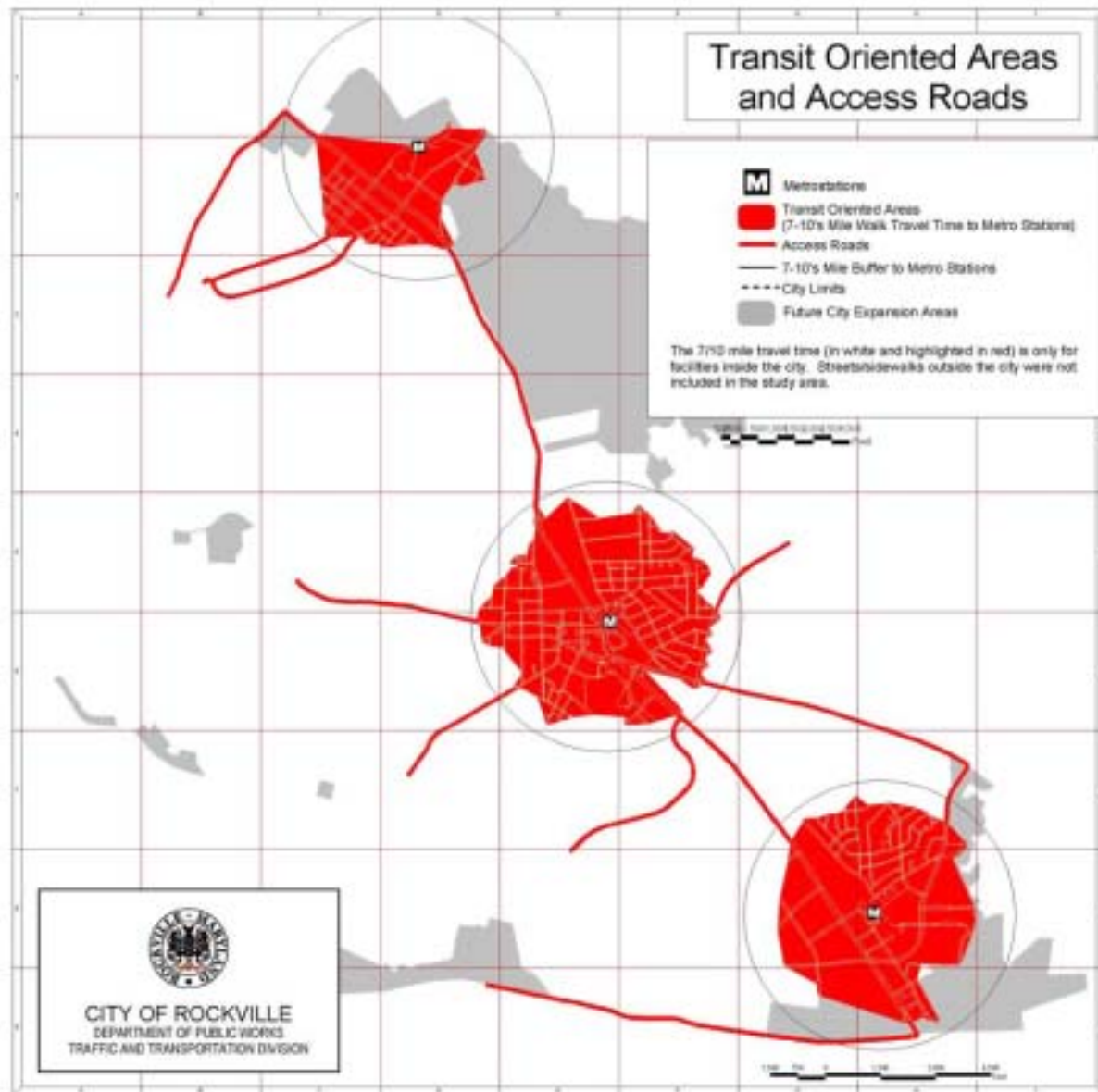
Metro Performance District	Area in close proximity to the Twinbrook Metro Station within which existence of the Metro Station has the greatest influence of pedestrian activity, types of uses and development densities (or other Metro Stations as may be amended in the Zoning Ordinance)
Mixed Use Development	A development containing any combination of office, commercial, and multifamily residential uses integrated vertically or horizontally
Modal Split	Amount of people using a certain means of transportation, including auto, transit, bicycle, or walking
Neighborhood Planning Area	The City is divided into 18 Neighborhood Planning Areas
Non-Auto Facility	Non-motorized networks or systems, including walkways, sidewalks, crosswalks, path, pedestrian plazas, bike lanes, and street shoulders
Off-site Threshold	The threshold that determines whether or not the TR must include Components C & D; the impact of development applications under this threshold is assumed to be so small that accounting for it is unreasonable or administratively impracticable
Pass-by Trips	Trips that would have traveled on a street adjacent to the subject development even if it had not be constructed; results in a reduction of new trip attributable to subject development
Peak Period	Typically, peak periods are defined as weekday hours from 7-9 AM and 4-6 PM. When necessary for a particular site, the Traffic & Transportation Division may select to expand the peak periods to include midday weekday or Saturday hours or to cover three (3) hours during the AM and PM peak periods. Peak periods, other than typical, will be used to take into account development-specific features as generators of traffic and/or study area congestion (i.e., the area congestion or site impact is expected to be outside typical peak period)
Scoping intake form	Form distributed when a planning inquiry is made; applicant must submit form to the Traffic & Transportation Division before the scoping meeting can take place
Scoping meeting	Meeting with applicant and Traffic & Transportation Division to discuss the detailed CTR requirements as they apply to the subject development
Scoping summary	Summary submitted by the applicant for the approval of the Traffic & Transportation Division, outlining the details of the TR agreed upon in the scoping meeting
Standard Traffic Methodology	The methodology used to analyze and evaluate the traffic impacts of development applications submitted to the City of Rockville prior to the adoption of the CTR
Road classification	The classification of a road as set forth in the transportation element of the Plan.
Subdivision	The creation of lots, either by dividing existing lots or parcels or combining existing lots, for the purpose of new development or redevelopment
Total Peak Hour Site Trip	Total number of trips (i.e., inbound plus outbound) generated by the development project during the busiest one-hour peak within the peak periods; calculated using the trip generation rates and methodology referenced in the CTR.
Traffic Control Device	Any sign, signal, marking or device placed or erected for the purpose of regulating, warning, or guiding vehicular traffic and/or pedestrians
Transit-Oriented	Areas where viable non-auto options exist and include areas within 7/10 th s of a mile accessible walking distance from

Area	existing and programmed Metro stations and fixed-guideway transit stations on dedicated transit rights-of-way; may also include major access routes to these areas
Transportation Demand Management	General term for strategies that promote alternatives to travel by single occupancy vehicle
Transportation Report	The report the CTR requires applicants to submit; consists of five components: Component A: Introduction and Existing Conditions Component B: Site Access & Circulation Component C: Automobile Traffic Analysis Component D: Non-Auto Off-site Analysis Component E: Summary, Mitigation and Credits
Transportation Staff Report	The report prepared and issued by the Traffic & Transportation Division after the submittal of the Transportation Report; addresses any issues with the development application and requires mitigations and conditions of approval
Trip	A one-way movement
Volume/Capacity Ratio	The ratio of an actual volume to the capacity at a given level of service

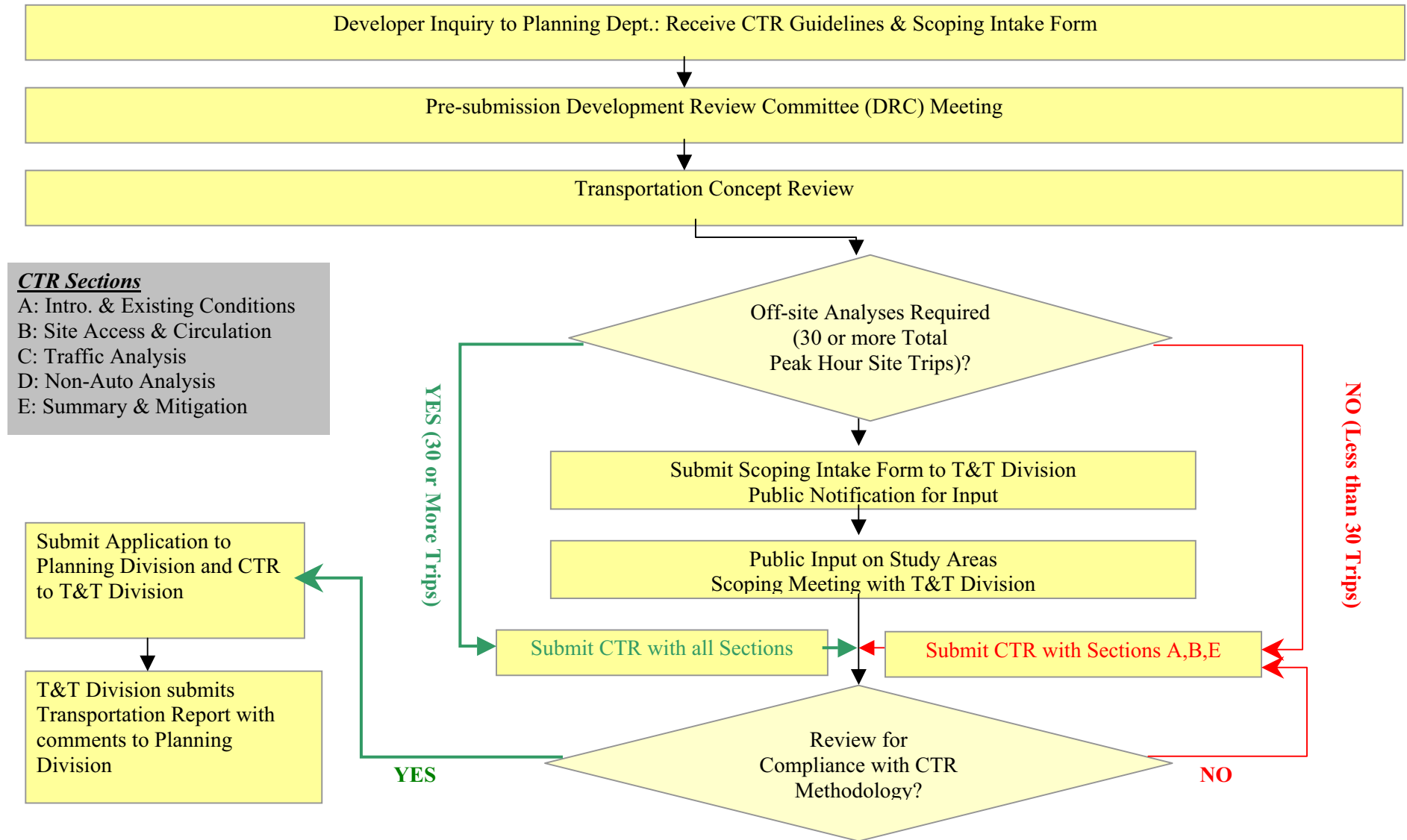
Appendix C: Comparison of STM and CTR

Current Standard Traffic Methodology (STM)	Proposed Replacement of STM, via CTR
<i>Threshold for Traffic Impact Study:</i> 100 total trips during the AM or PM weekday peak period	<i>Threshold for Off-Site Components of TR:</i> 30 total trips during one hour within the peak period. Typically, peak periods are defined as weekday hours from 7-9 AM and 4-6 PM. When necessary for a particular site, the Traffic & Transportation Division may expand the peak periods to include midday weekday or Saturday hours or to cover three (3) hours during the AM and PM peak periods. Peak periods may be adjusted in accordance with nationally accepted standards and practices to take into account development-specific features that generate traffic and/or study area congestion. Adjustments may be made based on factors such as the area of congestion or if site impact is expected to be outside typical peak periods.
Minimal analysis required for non-auto access	Separate analysis required for non-auto access
Focus on private passenger auto traffic	Multimodal focus
Traffic mitigation guidelines unclear	Clarification of traffic mitigation guidelines
No guidelines for non-auto mitigation	Guidelines for non-auto mitigation
Transportation Demand Management programs and policy not formalized, but offered as a form of mitigation	TDM policy formally established. TDM payments required. Additional TDM measures may be used as mitigation measures.
No clear guidelines for developing study area	Guidelines for developing non-auto study area and traffic study area
Uniform guidelines Citywide	Varying guidelines for Transit-Oriented and Non-Transit Oriented areas
	Guidance for development near activity centers (transit, bike/pedestrian facilities, schools, other public facilities)
	Guidance for compliance with City design standards and general policies
	Guidelines for contributions towards programmed transportation CIP regardless of their quantified impact

Appendix D: Map of Transit-Oriented Areas (TOAs)



Appendix E: CTR Methodology Flowchart



Appendix F: Scoping Intake Form



City of Rockville

Comprehensive Transportation Review SCOPING INTAKE FORM

Project Name:				
Permit No. (if available):				
Subject Property Address:				
Contact Person:				
Contact Phone Number:				
Contact Email Address:				
Proposed Land Use Density:	Use	Square Footage/ Dwelling Units		
Trip Generation	Peak Hour Site Trips			
	<i>Peak Period</i>	IN	OUT	TOTAL
	AM			
	PM			
	SAT			
Proposed Study Area (Boundaries and Intersections)				
Proposed Access Points:				
Projected Horizon (Build Out) Date:				
Statement of Operations				

Additional pages may be submitted if more space is needed.

Appendix G: Outline of Transportation Report

I. Component A—Introduction and Existing Conditions

- A. Proposed Project (text)
 - 1. Project Description/Overview
 - 2. Phasing and Timing of Planning and Build-out
 - 3. Proposed Land Use
 - 4. TOA Designation (from staff scoping)
 - 5. Hours of Operation
 - 6. Hours and Description of Employment Activity
- B. Existing Land Use (text)
- C. Area/Location (Map)
- D. Trip Generation Total (Figure)

II. Component B—Site Access and Circulation (*See also Appendix H*)

- A. Proposed Site Access and Circulation Transportation Statement
 - 1. Discussion of all planned site features that do not comply with City Codes/ Standards/ or Policies
 - 2. Hours of Deliveries, Pick-Ups, and Other Services
 - 3. Number of Driveways versus Auto Access Demand
 - 4. Accommodation and Circulation Plan for Largest Size Vehicles that will Access Site
 - 5. Parking Demand versus Parking Supply
 - 6. Internal and Abutting Roadways
 - a. Ownership
 - b. Road Classification
 - c. ADT Volumes
 - d. Traffic Speeds
 - e. Speed Limits
- B. Proposed Conditions Site Plan
 - 1. Traffic Immediate Access
 - a. Abutting Roadways (Plan View of Both Sides of Roadways)
 - b. Driveways
 - Location
 - Proximity to: a) Entrances; b) Intersections; c) Other Driveways
 - Alignment with Medians and Driveways across the Roadway
 - Traffic Control
 - Design
 - 2. Non-Auto Facilities
 - a. Sidewalks and Walkways
 - Proximity
 - Location
 - Condition
 - b. Bicycle Facilities
 - Bikeways: a) Proximity; b) Location; c) Road Classification
 - Bicycle Parking: Proximity and Location of a) Bike Racks and; b) Bike Lockers
 - c. Adjacent Transit Stations (primarily bus stops)
 - Proximity
 - Location
 - Route

- Amenities (concrete pad, bench, shelter)
- 3. Internal Circulation and Parking
 - a. Parking Lot Layout
 - b. Carpool and Vanpool Spaces
 - c. Location of Light Poles and Illumination
 - d. Fire Lanes
 - e. Loading/Unloading of Goods and Persons
 - f. Handicapped Facilities
 - g. Storage
 - h. Dumpsters/Refuse Compactors
 - i. Other Service Areas
 - j. Truck Maneuvering Areas
 - k. Signage and Pavement Markings
- 4. General
 - a. Easements
 - b. Right of Way Lines
 - c. Landscape Buffer Areas

II. Component C—Automobile Traffic Analysis

- A. Existing Conditions
 - 1. Existing Road Network and Lane Use (Figures)
 - 2. Existing Peak Hour Traffic Volumes (Figures)
 - 3. Existing Peak Hour CLV Summary (Figures)
- B. Background
 - 1. Background Development Projects and Land Use (Text)
 - 2. Yearly Growth (Text)
 - 3. Peak Hour Total Traffic Volumes (Existing, Background, Growth) (Figures)
 - 4. Background Peak Hour CLV Summary (Figures)
- C. Site Trips
 - 1. Directional Distribution (Figures)
 - 2. Peak Hour Site Generation Trips Summary Table (Figures)
 - 3. Total Future Peak Hour Trips (Figures)
 - 4. Total Peak Hour CLV Summary (Figures)
 - 5. Peak Hour CLV Comparison Table (Figures)

III. Component D—Non-Auto Analysis

- A. Existing Conditions
 - 1. Pedestrian Facilities
 - a. Inventory of the following facilities en route to activity centers identified DPW (Map) within the non-auto study area:
 - Sidewalks
 - Curb Ramps
 - Street Lights
 - b. Compliance with the Pedestrian Policy
 - 2. Bicycle Facilities
 - a. Inventory of the following facilities within non-auto study area:
 - Signed-Shared Roadways
 - Shared-Use Paths
 - Bike Lanes
 - b. Compliance with the Bike Master Plan
 - c. Connection to Bikeway Network

3. Transit Facilities:
 - a. Inventory of the following facilities within non-auto study area:
 - Bus Hubs
 - Bus and Shuttle Routes
 - Bus and Shuttle Shelters
 - Sidewalk Connection to Bus Shelter
 - Amenities and Technologies at Bus Shelter
 - Bus and Shuttle Ridership Volumes (provided by City when possible)
4. Intersection Inventory of the following facilities:

Chicane	Crosswalk
Cross-Hatch Crosswalk	Diverter
Hot Right	Illuminated Crosswalk
Median	Paddle
Pedestrian Head	Pedestrian Refuge
Raised Crosswalk	Speed Hump
Stop Sign	Traffic Circle
Turn Restriction	

5. Intersection Safety Ratings

IV. Component E—Summary, Mitigations, and Credits

- A. Summary of Findings
- B. Impacts
- C. Proposed Mitigation
- D. Transportation Demand Management
 1. Plan
 2. Contribution
 3. Final projected land use and density information for calculation

V. Appendices

- A. Scope Agreement Letter
If Applicable:
- B. Signal Warrant Analysis
- C. Accident Data Analysis
- D. Sight Distance Analysis
- E. Background Traffic by Project
- F. CLV Worksheets by Intersections
- G. Traffic Counts
- H. Yearly Growth from Existing Traffic

Appendix H: Site Access and Circulation Summary

For a detailed discussion of the principles in this Appendix, please refer to the latest edition of *Transportation and Land Development* by Vergil G. Stover and Frank J. Koepke; *Institute of Transportation Engineers*.

I. Access

A. Location: Based on functional area of abutting intersections, median cuts, and access points across the street

- ☞ AASHTO specifically states that “Driveways should not be situated within the functional boundary of at-grade intersections. This boundary would include the longitudinal limits of auxiliary lanes” [1, p.793, 1994; p.841, 1990;p.888, 1984]
- ☞ Access and circulation design of the site must be designed so as to provide good access to the site from abutting roadway networks. Layout of the buildings develops from a good access and circulation plan. Footprint of the building depends on the access circulation plan.
- ☞ Minimum Corner Clearance:
SEE *Transportation and Land Development* FIGURE 6-18:
DEFINITION OF MARGINAL CORNER CLEARANCE (PAGE 6-26)
- ☞ Median Corner Clearance:
SEE *Transportation and Land Development* FIGURE 6-19:
DEFINITION OF MARGINAL CORNER CLEARANCE (PAGE 6-26)
- ☞ Upstream Functional Intersection Area:
SEE *Transportation and Land Development* FIGURE 5-20:
UPSTREAM FUNCTIONAL INTERSECTION AREA (PAGE 5-42)

B. Design

- ☞ There are two basic design types of access points: Driveway Apron and Street Cut. Street cuts should be used whenever the access location coincides with two intersecting streets. Technically driveways are intersections. For all other locations, the appropriate Driveway Apron Design Standard should be selected. [SEE *City of Rockville Standards and Details for Construction*]
- ☞ Control design (e.g.; yield, stop, traffic signal): Must conform to MUTCD
- ☞ Sight distance: Minimum requirements as established by AASTHO must be applied through the design process. Except for single-family dwellings, the developer must present a Sight Distance Certification form with the detail application.
- ☞ Adequate throat distance must be provided to allow for queuing of outbound vehicles and proper transition of inbound vehicles.
- ☞ The adjacent road network may not be utilized for site circulation.
- ☞ Visibility and visual cues should be provided to identify access points

c. Pedestrian Site Access

Pedestrian access must comply with standards outlined in the City’s Pedestrian Policy. The following are additional standards of compliance:

- ☞ Along major and arterial streets, sidewalks must be provided on both sides within residential and business areas, and on one side of the street in all other areas.

- # Sidewalks must be provided on both sides of business streets, and on at least one side of industrial streets.
- # In residential areas, sidewalks must be provided on both sides of primary streets, and on at least one side of secondary streets. Around schools, secondary streets must be provided with sidewalks on both sides.
- # For all road classifications, sidewalks must be placed on both sides of the street on routes served by local mass transit.
- # In new subdivisions, sidewalks must be constructed on both sides of each street.
- # In PRU developments, sidewalks must be constructed on both sides of each street, with specific requirements for sidewalks and other walkways to be determined by the Mayor and Council.
- # In the Town Center, sidewalks must be provided on both sides of each street and must be constructed in compliance with the design criteria contained in the Town Center Urban Design Plan.

Provision of Sidewalks Based on Street Type		
Street Type	Area	Sidewalks
Major	Residential	Both sides
Major	Business	Both sides
Major	All Other	One side
Arterial	Residential	Both sides
Arterial	Business	Both sides
Arterial	All Other	One side
Industrial	All	One side
Primary	Residential	Both
Secondary	Residential	One
All	Around schools	Both
All	Routes served by local mass transit	Both
All	New subdivisions	Both
All	PRU developments	Both
All	Town Center	Both

II. Circulation

a. *Passenger Vehicles: Parking Design as outlined in the Chapter 25 of the Zoning Ordinance*

b. *Pedestrian/bike circulation and conflicts with vehicles*

Pedestrian circulation must comply with standards outlined in the City's Pedestrian Policy. The following are additional standards of compliance:

- # Sidewalks and shared-use paths must be at least 4 feet in width, and constructed from hard-surface materials such as concrete, asphalt, or brick.
- # For development applications with sidewalks parallel to arterial streets, applicant will discuss with City staff whether a wider hard-surface pathway to accommodate bicycles as well as pedestrians is feasible. The width of such facilities must be at least eight (8) feet or ten (10) feet if a buffer is not feasible.
- # Sidewalks should be separated from the adjacent roadway by a buffer strip at least three (3) feet wide.

- ⌘ In both new and existing developments, raised pedestrian refuge areas may be provided at intersections and other street crossing points. These refuges can take the form of islands or peninsular curb extensions ("chokers"). In coordination with sidewalks, chokers are to be particularly encouraged at intersections where both vehicle and pedestrian movements are heavy and where on-street parking may be desirable.
- ⌘ Curb ramps meeting ADA requirements (specifically, the **Uniform Federal Accessibility Standards** [UFAS]) must be constructed to provide access to every legally defined crosswalk, both marked and unmarked.
- ⌘ Crosswalks must be marked within school zones, at all signalized intersections, *adjacent to Metro stations*, and at all locations with at least a moderate concentration of pedestrian activity, especially in commercial areas.
- ⌘ In accordance with Maryland Law, marked crosswalks must also be hatched with diagonal or longitudinal (to the street) stripes at the following locations:
 - i. Streets where the speed limit is greater than 35 mph.
 - ii. Within school zones.
 - iii. Mid-block locations.
 - iv. Where the presence of a crosswalk may be otherwise unexpected.
- ⌘ Pedestrian signals must be installed and maintained at all signalized crosswalks a.) that cross the "main street" signal movement, and b.) where pedestrian movements potentially conflict with an exclusive (green arrow) turning movement.

c. Bicycle parking facilities

- ⌘ For non-residential locations, a ratio of one (1) bicycle parking space to 50 auto parking spaces must be installed.
- ⌘ Commercial, multi-family residential, and retail uses must provide bicycle racks or lockers, as determined at the scoping meeting.

d. Proper Truck access (solid waste managements, deliveries, emergency vehicles?) loading areas

e. Proper Internal street layout design (if part of plans)

Appendix I: Road Classifications

Rockville Classification <i>(Standard Term)</i>	Description	Typical Volumes
Limited Access <i>(Freeway)</i>	Carries through traffic. Lanes are divided by a median. Access points are very limited.	50,000 to 250,000 vehicles per day
Major <i>(Major Arterial)</i>	Carries through traffic. Lanes are divided by a median. Access points are generally limited.	Greater than 25,000 vehicles per day
Arterial <i>(Minor Arterial)</i>	Carries through traffic. Design is more limited than on major streets. Access is less limited.	10,000 to 30,000 vehicles per day
Primary Residential – Class I <i>(Major Collector)</i> and Class II <i>(Minor Collector)</i>	Distributes traffic between neighborhoods and arterial streets. Typically has two traffic lanes.	Class I – In excess of 5,000 vehicles per day Class II – Less than 5,000 vehicles per day
Secondary Residential <i>(Access)</i>	Provides local access to residential properties. All non-primary streets are classified as secondary.	Up to 2,000 vehicles per day
Business District <i>(Major/Minor Collector)</i>	Serves adjacent business land use. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day
Primary Industrial <i>(Major Collector)</i>	Serves adjacent industrial and office land uses. Typically has four undivided traffic lanes.	5,000 to 20,000 vehicles per day
Secondary Industrial <i>(Minor Collector)</i>	Serves adjacent industrial and office land uses. Typically has two undivided traffic lanes.	Up to 2,000 vehicles per day

Appendix J: Intersection Capacity Analysis—Critical Lane Volume (CLV) Method

This Appendix describes the methodology used by the City of Rockville to analyze the capacity of intersections.¹³ This Appendix should be sufficiently descriptive to enable the applicant to utilize the CLV method at both signalized and unsignalized intersections within the study area, as per City standards. For the latter, a two-phase operation with a 90 second cycle should be assumed. The CLV method will be appropriate for most intersection configurations and can be easily varied for special situations or unusual conditions. This method applies to isolated intersections or any other location where the operation is not radically affected by adjacent traffic signals. Conversely, modification to this procedure or use of methodology specific to arterial streets is necessary if intersection operation is affected by the development. Any variations from the procedures outlined below must be approved by the Chief of Traffic & Transportation Division and properly documented in Section III—Automobile Traffic Analysis of the Transportation Report.

PROCEDURE

Step 1. Determine/Collect the following information

- 4# Intersection Control Type
- 4# Cycle Length (Assume 90 seconds for stop sign control)
- 4# Signal Phasing (Assume 2 phases for stop sign control),
Note the following features: right turn on red, split phasing, exclusive movements, total number of phases
- 4# Turning Movement Volumes
- 4# Intersection Geometries
- 4# Note the following features: free-flow right lanes

Step 2. Determine intersection capacity based on the following table:

Intersection Capacity (100% of capacity)			
Cycle Length (seconds)	Number of Phases		
	2	3	4 or more
89 or less	1500	1400	1300
90 – 119	1600	1500	1400
120 – 149	1650	1600	1500
150 or more	1700	1650	1550

Step 3. Determine the left turn movement equivalent: This equivalent is use in conjunction with through movements for shared lanes or in comparison to through movements for split phasing. Left turns as opposing movements are calculated in Step 6.

¹³ A technical description of the critical lane volume (CLV) method was introduced in the January 1971 issue of *Traffic Engineering*. Since its introduction, the CLV method has evolved into a more sophisticated intersection capacity analysis. Different jurisdictions have adopted the CLV method with minor modifications. Although different versions of the CLV method have been developed, the same basic concepts have been embraced.

Shared Left Turn Lane	
Opposing Volume (Through+Right)	Lane Use Factor
<199	1.10
200 – 599	2.00
600 – 799	3.00
800 – 999	4.00
> 999	5.00

Exclusive Left Turn Lane	
Number of Lanes	Lane Use Factor
1	1.10
2	0.60
3	0.40

Step 4. Determine the right turn movement equivalent

a. Free-Flow Right Turns

A free-flow right turn is one that is not controlled by the traffic signal or stop sign. Normally the movement is isolated by a channelizing island and controlled by a yield sign. If the right turn movement is serviced by an exclusive right turn lane of sufficient length that right turning vehicles are not part of the queue of through vehicles, the right turning volumes can be excluded from the critical lane analysis. Documented data or evaluation of the intersection can be used to combine a sufficient number (percent) of the right turns with the through traffic to reflect actual peak hour operations. In the absence of such knowledge a queuing analysis could be done. As a rule-of-thumb 150 feet of exclusive right turn lane will permit excluding all right turns; less than 50 feet will require that all rights be included. Distances within that range suggest that a portion of the right turn volume be included.

b. Exclusive Right Turn Lanes

Where the right lane is devoted to the exclusive use of right turn vehicles, a maximum lane volume should be computed separately for through movements and right turn movements. If a right turn phase overlap is provided with a left turn phase on the cross street, subtract the overlapping left turn volume from the right turn volume. The highest of the through or right turn lane volumes should be added to the opposing left turn volume, except where significant right turns on red occur.

c. Right Turn on Red (RTOR)

The number of vehicles that can take advantage of the RTOR feature vary greatly based on site and traffic characteristics. At higher volume intersections, as the level of service (LOS) diminishes, few gaps are generally available for RTOR. Unless observations of the RTOR operations support excluding some right turns from the critical lane analysis, this feature will normally not be considered.

Right Turn Lane Use Factor	
Right Turn	Lane Use Factor
Shared Lane	1.00
Free-Flow	Zero
Exclusive	Right Turns - Overlapping Left Turns
Right Turn on Red	Case-by-case determination

Step 5. Determine the through movement equivalent: On multi-lane approaches with no separate left turn lane, the left turn volume will be adjusted using the lane factor (shared lane) of step 3. When the adjusted left turn volume is greater than the remaining volume being included in the analysis, the left most lane will be considered an exclusive left turn lane. The analysis will proceed with that assumption. For other cases, the resulting left turn volume will be added to the rest of the approach volume and the appropriate through lane use factor applied to the total. Similar consideration should be given to approaches with no separate right turn lane.

Through Lane Use Factor	
Number of Lanes	Lane Use Factor
1	1.00
2	0.53
3	0.37
4	0.30
5	0.25

Step 6. Determine the opposing movement equivalent: This step is not necessary for intersection approaches operating under split phasing. A shared left turn lane should be counted as one lane in addition to any other exclusive left turn lane(s).

Opposing Left Turn Lane Use Factor	
Number of Left Turn Lanes	Lane Use Factor
Split Phase Operation	Zero
1	1.10
2	0.60
3	0.40

Step 7. Determine the approach CLV by adding the highest of the through movement equivalent (Step 5) or the right turns minus overlapping left turns (Step 4) plus opposing movement equivalent (Step 6) unless the approach operates under a split phase. If the approach operates under split phase, select the highest left, right or movement equivalent (Steps 3, 4, and 5, respectively).

Step 8. Determine the East-West CLV by selecting the highest approach CLV (Step 7) of the two approaches unless they operate under a split phase. If the East and West approaches operated under split phase, add the two approach CLVs.

Step 9. Determine the North-South CLV by selecting the highest approach CLV of the two approaches unless they operate under a split phase. If the North and South approaches operated under split phase, add the two approach CLVs

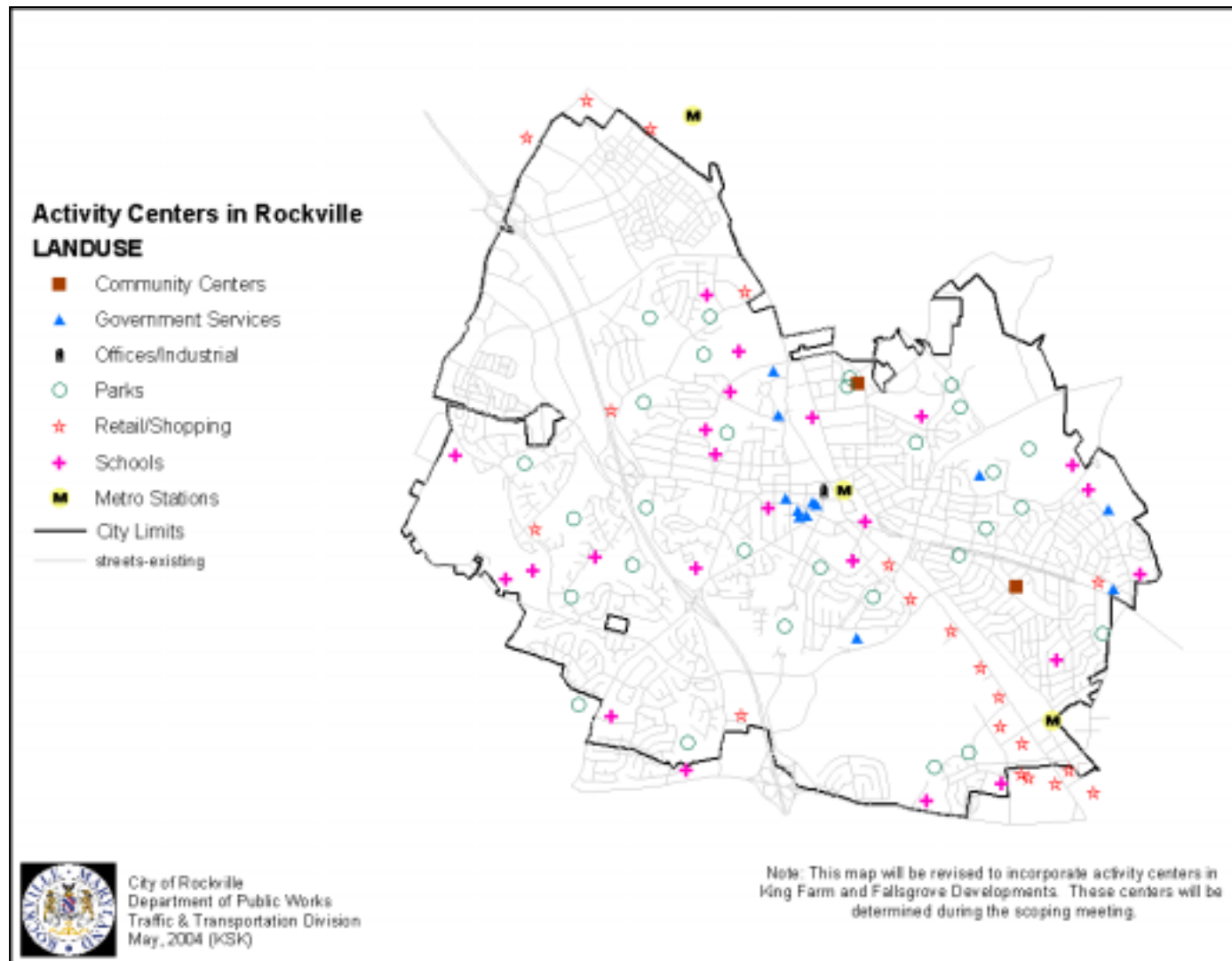
Step 10. Determine the intersection CLV by adding the East-West CLV (Step 8) and North-South CLV (Step 9).

Step 11. Determine the intersection volume/capacity (V/C) by dividing the intersection CLV (step 10) by the intersection capacity (step 2).

Step 12. Determine the intersection level of service (LOS) by comparing the intersection V/C obtained in Step 11 to the following table:

Level of Service (LOS)	
LOS	Range (% of capacity)
A	Less than 59%
B	60% to 69%
C	70% to 79%
D	80% to 89%
E	90% to 99%
F	Greater than 100%

Appendix K: Map of Activity Centers



Appendix L: TDM Programs

Acceptable uses for Transportation Demand Management funds include but are not limited to:

<p><i>Alternative Work Schedules</i></p> <ul style="list-style-type: none"> Flextime Staggered Shifts Compressed Work Week <p><i>Alternative Modes</i></p> <ul style="list-style-type: none"> Biking Amenities Carpooling and Vanpooling Electric Vehicle Project Flexcar Guaranteed Rides Home Pedestrian Facilities Improvements Shuttle or Subscription Buses Other Non-Motorized Travel Amenities <p><i>Computer Matching Services</i></p> <ul style="list-style-type: none"> Employee Transportation Coordinator Pre-Trip Travel Information <p><i>Enhanced Information Systems</i></p> <p><i>Financial Incentives</i></p> <ul style="list-style-type: none"> Enhanced FARE SHARE Program Tax Benefits Transit or Bike Riding Subsidies Transportation Allowances Other Innovative Financing Measures <p><i>Information Collection and Distribution</i></p> <ul style="list-style-type: none"> Advertising Alternative Modes Master Plans/Policies in public places <p>Data Collection/Counts</p>	<p><i>Land Use Zoning</i></p> <ul style="list-style-type: none"> Density Bonuses Transit-Friendly Design Reduced Parking Requirements <p><i>Marketing and Surveys</i></p> <p><i>Multimodal/Transit Centers</i></p> <ul style="list-style-type: none"> Construction and Operation <p><i>Parking Management</i></p> <ul style="list-style-type: none"> Park and Ride Lots Parking Charges <p><i>Staffing</i></p> <p><i>Telecommunications</i></p> <ul style="list-style-type: none"> Telecommuting Teleconferencing Telework Centers <p><i>Transit</i></p> <ul style="list-style-type: none"> Concierge Centers Intelligent Transportation Systems Paratransit Facilities Real Time Transit Information Service Improvements in Facilities, Routes, and Schedules Transit Stores Upgraded Transit Vehicle
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Appendix M: Transportation Report Study Areas

TABLE 5: AUTO TRAFFIC STUDY AREAS							
TRIPS	Minimum No. of Intersections or all Intersections within Radii*	LAND USE/DEVELOPMENT SIZE ^{14, 15}					
New peak hour site trips ¹⁶		Retail (SF of GFA)	Office (SF of GFA)	Residential (Units)			
				SF	TH	GA	HR
30 - 150	4	5,000-20,000	20,000-90,000	30-160	40-240	65-325	65-425
151 - 350	8	20,001-45,000	90,001-220,000	161-425	241-700	326-700	426-900
351 - 700	12 or .45 Mile	45,001-95,000	220,001-400,000	426-700	701-1,250	700-1,250	901-1,300
> 700	16 or .50 Mile	>95,000	>400,000	>700	>1,250	>1,250	>1,300

* The number of signalized intersections or all signalized intersections within the radii (or major portals to the site), whichever is greater.

Table 10: Non-Auto Study Areas						
New Peak Hour Site Trips	30-350		351-500		500+	
Minimum Activity Center Routes Evaluated	1		2		3	
Accessibility to Activity Centers	.25 mile radius	.35 mile radius	.35 mile radius	.45 mile radius	.45 mile radius	.5 mile radius
TOA Designation	TOA	Non-TOA	TOA	Non-TOA	TOA	Non-TOA

¹⁴ Data are based on the Maryland-National Capital Park and Planning Commission, Montgomery County Department of Park and Planning Local Area Transportation Review guidelines, July 2004, and correspond roughly to trips generated during peak hours that generate the highest number of trips (A.M. or P.M.). Other land uses (schools, auto filling stations, day care centers, e.g.) shall be determined during the scoping meeting.

¹⁵ Mixed-use developments must account for generations based on the different land uses.

¹⁶ The study area is based on net new trips generated **before credits** are applied.